State Responsibility and Liability for Environmental Damage Caused by Nuclear Accidents

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This book is dedicated to the memory of my brother
Salah Zeidan
who passed away
while I was conducting this study

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Sayed Zeidan
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CONTENTS

ABBREVIATIONS

AASL	Annals of Air and Space Law
ADV	Archiv Des Völkerrechts
AFDDI	Annuaire Francais De Droit International
AJH	Acta Juridica Hungarica
AJIL	The American Journal of International Law
ARIA	The American Review of International Arbitration
ASL	Air and Space Law
AYIL	Australian Year Book of International Law
BAS	Bulletin of the Atomic Scientists
BCEALR	Boston College Environmental Affairs Law Review
BGB	Bürgerliches Gesetzbuch
BJIL	Berkeley Journal of International Law
BUILJ	Boston University of International Law Journal
Bundesgesetzblatt	German Federal Law Gazette
BYIL	The British Yearbook of International Law
CJIELP	Colorado Journal of International Environmental Law and Policy
CJIL	Connecticut Journal of International Law
CJTL	Columbia Journal of Transnational Law
CRAMRA	Convention on the Regulation of Antarctic Mineral Resources Activities
CRTD	Convention on Civil Liability for Damage Caused During Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels
CYIL	The Canadian Yearbook of International Law
DJILP	Denver Journal of International Law & Policy
ECE	United Nations Economic Commission for Europe
EELR	European Environmental Law Review
EIA	Environmental Impact Assessment
EIL	Encyclopedia of International Law
EJIL	The European Journal of International Law
ELQ	Ecology Law Quarterly
ELR	European Law Review
ENPPA	The Egypt Nuclear Power Plants Authority
EJIL	Environmental Journal of International law

EP	Energy Policy
EPIL	Encyclopedia of Public International Law
EPL	Environmental Policy and Law
ERIL	The Egyptian Review of International Law
EU	European Union
EURATOM	The European Atomic Energy Community
FAO	Food and Agriculture Organization of the United Nations
FILJ	Fordham International Law Journal
GELA	Global Environmental Law Annual
GIELR	The Georgetown International Environmental Law Review
GJIL	Georgia Journal of International Law
GJILCL	Georgia Journal of International Law and Comparative Law
GWJILE	The George Washington Journal of International Law and Economics
GYIL	German Yearbook of International Law
HHRJ	Harvard Human Rights Journal
HILJ	Harvard International Law Journal
HJP	Hitotsubashi of Journal and Politics
HLJ	Hastings Law Journal
HYIL	Hague Yearbook of International Law
IBPCA	The International Bureau of the Permanent Court of Arbitration
IAEA	International Atomic Energy Agency
ICC	International Criminal Court
ICCPR	International Covenant on Civil and Political Rights
ICRP	International Commission on Radiological Protection
ICJ	The International Court of Justice
ICLQ	The International & Comparative Law Quarterly
IECL	International Encyclopedia of Comparative Law
IELR	International Environmental Law Reports
IJMCL	The International Journal of Marine and Coastal Law
IJNL	International Journal of Nuclear Law
IL	The International Lawyer
ILC	International Law Commission
ILM	International Legal Materials
ILO	International Labour Organisation
ILR	International Law Reports
ILS	International Law Series

ILSAJICL	ILSA Journal of International & Comparative Law
IMCY	International Maritime Committee, Yearbook
IMO	International Maritime Organization
Ind.JIL	The Indian Journal of International Law
INLA	International Nuclear Law Association
INLEX	International Expert Group on Nuclear Liability
In.LR	Indiana Law Review
INRES	The International Nuclear and Radiological Events Scale
IRRC	International Review of the Red Cross
ITLOS	The International Tribunal for the Law of the Sea
JALC	Journal of Air Law and Commerce
JEL	Journal of Environmental Law
JENRL	Journal of Energy & Natural Resources Law
JHM	Journal of Hazardous Materials
JILE	The Journal of International Law and Economics
JILP	Journal of International Law and Practice
JMLC	Journal of Maritime Law and Commerce
JNRL	Journal of Natural Resources Law
JSL	Journal of Space Law
KIG	Kansainoikeus Ius Gentium
KJAS	The Korean Journal of Air Space
LEDJ	Law, Environment and Development Journal
LJIL	Leiden Journal of International Law
LLAICLJ	Loyola of Los Angeles International and Comparative Law Journal
LPICT	The Law and Practice of International Courts and Tribunals
LQR	The Law Quarterly Review
MJIL	Michigan Journal of International Law
MP	Marine Policy
MPYUNL	Max Planck Yearbook of United Nations Law
NEA	Nuclear Energy Agency of the OECD
NJIL	Nordic Journal of International Law
NJILB	Northwestern Journal of International Law & Business
NLB	Nuclear Law Bulletin
NRJ	Natural Resources Journal
NYIL	Netherlands Yearbook of International Law
NYUELJ	New York University Environmental Law Journal
NYUJILP	New York University Journal of International Law and Politics

NYULR	New York University Law Review
OAU	Organization of African Unity
ODIL	Ocean Development & International Law
OECD	Organization for Economic Co-operation and Development
OJ	Official Journal of the European Communities
OSPAR	Convention for the Protection of the Marine Environment of the North- East Atlantic
PAHO	Pan American Health Organization
PCA	Permanent Court of Arbitration
PCIJ	The Permanent Court of International Justice
PELR	Pace Environmental Law Review
PLJ	Philippine Law Journal
PYIL	Polish Yearbook of International Law
RDC	Recueil Des Cours
RDMC	R. du marché commun
RECIEL	Review of European Community & International Environmental Law
REDDI	Revue Égyption De Droit International
RFILJ	Review Foreign Investment Law Journal
RGDDIP	Revue General De Droit International Public
RHDDI	Revue Hellénique De Droit International
RIDDP	Revue Internationale De Droit Penal,
RLES	Review of the Legal and Economic Sciences
SADC	Southern African Development Community
SAYIL	South African Yearbook of International Law
SCNL	Standing Committee on Liability for Nuclear Damage
SDLR	San Diego Law Review
SDR	Special Drawing Right of the International Monetary Fund
SJIL	Stanford Journal of International Law
TA	Thesaurus Acroasium
TEPCO	Tokyo Electric Power Company
TILY	Tort and Insurance Law Yearbook
TMLJ	Tulane Maritime Law Journal
UCLAPBLJ	UCLA Pacific Basin Law Journal
UDHR	Universal Declaration of Human Rights
ULR	Uniform Law Review
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Program

UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNRIAA (RIAA)	United Nations, Reports of International Arbitral Awards
UNTS	United Nations Treaty Series
Vand.LR	Vanderbilt Law Review
VLR	Virginia Law Review
WHO	World Health Organization
WTO	World Trade Organization
YIL	The Yearbook of International Law
YIEL	Yearbook of International Environmental Law
YILC	Yearbook of International Law Commission
YJIL	The Yale Journal of International Law
YLJ	The Yale Law Journal
YML	Yearbook of Maritime Law
ZFAÖRV	Zeitschrift Für Ausländisches Öffentliches Recht und Völkerrecht
ZFLW (GJASL)	Zeitschrift Für Luft-und Weltraumrecht (German Journal of Air and Space Law

1 INTRODUCTION

1.1 The benefits and hazards of nuclear energy: Two sides of the same coin

Nuclear reactors are important for the generation of energy. The use of nuclear reactors for peaceful purposes started in the mid-1950s with the establishment of the first commercial nuclear power plant in the former Union of Soviet Socialist Republics (USSR) in 1954. Since then they have been widely used in many ways on land, for example, for the operation of power plants, in outer space to launch satellites and at sea for propelling ships. Nowadays the use of nuclear reactors to generate power has become inevitable for many countries, particularly the developed nations, and an issue for the future for the developing countries as a result of the inevitable decline of fossil fuel energy sources such as coal, oil and natural gas, in addition to the high costs of these sources when compared with nuclear fuel.[1] Moreover, nuclear energy is a clean source of energy, it does not emit any greenhouse gasses and other pollutants into the air, and does not present any threat to the environment if it has been used in a safe manner. The use of nuclear energy will inevitably help to protect the environment from the hazards arising from the use of traditional fuels if it does not lead to any serious accidents. The traditional fuels now present a real threat to the environment because of the increase in harmful emissions. The use of nuclear energy in a safe manner prevents climate change resulting from the harmful emissions caused by the use of traditional fuels. Consequently, the international community is faced with a great challenge if nuclear energy is used instead of traditional fuels. The international community is obliged to take efficient safety and precautionary measures to prevent the occurrence of major nuclear accidents and their harmful consequences, and must ensure the safe operation of nuclear reactors, the safe handling and transport of nuclear substances, and the safe disposal of radioactive waste and spent fuel resulting from the operation of nuclear reactors.[2]

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[1] Krateros Iōannou, "Nuclear Energy, Peaceful Uses", in: EPIL, Vol. III, 1997, pp. 700-705, at pp. 700-701.

[2] Nathalie L. J. T. Horbach (ed.), "Contemporary Developments in Nuclear Energy Law: Harmonising Legislation in CEEC/NIS", Kluwer Law International, The Hague/London/Boston, 1999, at p. xvii.

Nevertheless, the increasing number of nuclear reactors raises the possibility of serious nuclear accidents. An inherent problem in using nuclear power is that radiation is not normally visible and no one can stop its spreading through the atmosphere to surrounding States. Therefore, there is a high probability that it will cause transboundary nuclear damage to the environment of other States as well as in the global commons. As a consequence of the multiple uses of nuclear reactors, major nuclear accidents may occur when nuclear reactors cause transboundary environmental nuclear damage beyond the States on whose territory the nuclear activity was conducted or under whose jurisdiction or control such an activity was carried out. Since nuclear reactors have been used for peaceful purposes, a number of major nuclear accidents have already occurred and have had serious harmful consequences for people, property and the environment. The worst accidents in the history of nuclear reactors were at Windscale in Great Britain in 1957, Chalk River in Canada in 1958, Cosmos 954 Satellites in Canada in 1978, the Three Mile Island in the United States in 1979, Chernobyl in Ukraine in the USSR in 1986, Tokai-Mura in Japan in 1999 and Fukushima in Japan in 2011.

1.2 The aim of the study

The objective of this dissertation is to provide an analytical, practical and theoretical framework on international liability and responsibility for environmental damage caused by major nuclear accidents as a result of nuclear activities. As hazardous activities not prohibited by international law, nuclear activities are carried out under certain obligations aimed at controlling the performance of these activities in order to prevent damage before it occurs. The dissertation therefore aims to examine of the primary obligations imposed upon the State by international law to prevent, reduce and redress damage caused by a nuclear accident. Breaching these obligations means that the State is responsible for wrongful acts. However, liability for nuclear damage caused by nuclear energy as a lawful activity is essentially based on the absolute or risk liability. The liability applies to the operator of a nuclear installation or the Installations State[3] when a nuclear accident causes nuclear damage. Therefore, the dissertation also aims to examine liability for environmental damage under the absolute liability principle.

These questions are studied by examining and analyzing the special regime for nuclear liability drawn up in certain nuclear liability conventions and the traditional rules in international law on the liability of States for en-

[3] The study will use the terms “the Installation State”, “the Origin State”, “the Source State”, “the State in whose territory or under whose jurisdiction or control the activity has been carried out” to indicate the same meaning.

vironmental nuclear damage, as a function of their international liability for the injurious consequences of acts not ordinarily prohibited by international law, as well as State responsibility for such damage as a result of breaching its obligations under the general rules of international law. The Conventions govern the liability of the operator of a nuclear installation and State intervention to provide additional compensation to victims of nuclear damage under the nuclear liability conventions. However, the examination of the liability of the State under international law will provide the basis for a comprehensive concept of international responsibility to prevent, minimize, and redress environmental damage caused by nuclear accidents according to the general rules of international law as adopted in the International Law Commission (ILC) draft articles on international liability and responsibility.

Thus the long-term aim of the nuclear liability regime as presented by this study is to provide two types of protection to victims of nuclear damage: precautionary and curative protection. Precautionary protection requires the general and comprehensive application of the rules adopted in decisions, recommendations, international conventions and the general rules in international law. It is "protective" in the sense that these rules are applied in order to prevent the risk of nuclear accidents. Curative protection, on the other hand, is applied when environmental damage has already been caused by the accident and is aimed at mitigating or even reducing (if not fully eliminating) and repairing the damage caused by the accident. This is the purpose of a comprehensive international regime of nuclear liability.

Finally, in terms of scope, the study carries out a thorough examination of the various elements of liability which constitute a comprehensive international liability mechanism to govern liability for environmental damage caused by nuclear accidents. However, it is limited by the fact that it only covers environmental damage caused by peaceful nuclear activities, while excluding damage caused by non-peaceful nuclear activities. The scope is also limited to environmental nuclear damage caused to a State as a subject of international law and excludes damage caused in areas beyond the territory or beyond the jurisdiction or control of a State, i.e., damage caused to the global commons. Due to the complexity of the latter damage, the ILC also excluded it from its draft articles for the codification of the issues of international liability.[4]

[4] Official Records of the General Assembly, Fifty-seventh Session, Supplement No. 10 (A/57/10), Para. 447; Report of the ILC at its 58th session in 2006, submitted to the General Assembly (A/61/10), at p. 112, para. 7; Michael J. Matheson, "The Fifty-Sixth Session of the International Law Commission", in: AJIL, Vol. 99, No. 1 (Jan. 2005), pp. 211-213, at p.212.

1.3 Liability problems and the response at the international level

The Chernobyl accident in 1986 has been the most dangerous accident up to now and alerted the whole world to the danger of using nuclear reactors. Widespread damage from the accident has been documented in and outside the USSR.[5] This accident had harmful effects on people, property and the environment worldwide. The specific characteristics of the accident led to the widespread distribution of radioactivity throughout the northern hemisphere, mainly across Europe. The accident caused many billions of dollars worth of damage, not only in the USSR, but also throughout the rest of Europe. Outside the immediate area surrounding the site of the accident, most of the costs resulted from preventive measures ordered by governments to protect their populations and the environment from the hazards of ionising radiation. Nevertheless, the USSR refused to accept liability for the damage caused by the accident in other countries and only accepted a moral responsibility, insisting that it would not endorse liability in the absence of a binding treaty obligation to that effect. The USSR was not a party to any nuclear liability convention and there is no convention on State liability for nuclear damage. As a result, no victim of the Chernobyl accident was compensated in accordance with the rules of international law, and no claims have been paid, or tendered.[6]

The Chernobyl accident revealed the inadequacy of the existing regime of international liability to repair the damage suffered as a result of a major nu-

[5] Able J. González, "The Radiological Health Consequences of Chernobyl: The Dilemma of Causation", in: OECD/NEA and IAEA, 1993, pp. 25-55; Leigh Hancher and Peter Cameron, "After Chernobyl: Has Anything Really Changed?" in: Peter Cameron, Leigh Hancher and Wolfgang Kühn (eds.) Nuclear Energy Law After Chernobyl, Graham & Trotman , London/Dordrecht/Boston, 1988, pp. 179-195; NEA Secretariat, "The Accident at Chernobyl –Economic Damage and Its Compensation in Western Europe", in: NLB, No. 39, 1987, pp. 58-65; OECD/NEA, "International Nuclear Energy Law in the Post-Chernobyl Period", OECD, Paris 2006; OECD/NEA, "Chernobyl Ten Years On, Radiological and Health Impact: An Assessment by the NEA Committee on Radiation Protection and Public Health, November 1995", OECD, Paris, 1996; N. C. Rasmussen, "Three Mile Island and Chernobyl: What Happened? What Did Not?" in: OECD, Three Mile Island Reactor Pressure Vessel Investigation Project: Achievements and Significant Results, OECD, Paris 1994; Presidential Commission on Catastrophic Nuclear Accidents, "Report to the Congress from the Presidential Commission on Catastrophic Nuclear Accidents", Volume one, August 1990, at pp. 76-78; John Woodlife, "Chernobyl: Four Years On", in: ICLQ, Vol. 39, Issue 2, 1990, pp. 461-471.

[6] Norbert Pelzer, "The Hazards Arising Out of the Peaceful Use of Nuclear Energy", in: Strohl and Pelzer, 1994, pp. 207-300, at pp. 292-293.

clear accident.[7] The accident highlighted the need to promote the traditional rules of international law on liability and the weakness of the nuclear liability conventions to deal with technological advances and uses of nuclear reactors. It revealed even greater gaps and inadequacies in the existing nuclear liability conventions, as well as in the national legislation of certain countries.[8] After the accident, the International Atomic Energy Agency (hereinafter the IAEA) Member States recognized the need to review the ordinary rules of international liability and to develop new rules of international law to cope with the potential danger arising from the use of nuclear reactors.[9]

This led to the development of the existing nuclear liability conventions and the adoption of new rules on nuclear liability to cover damage caused by the use of nuclear energy. The nuclear liability conventions were developed during the early 1960s, under the auspices of specialized international organizations in the field of nuclear energy, when the peaceful uses of nuclear energy were in their infancy.[10] The 1960 Paris Convention on Third Party

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[7] Alan E. Boyle, "Nuclear Energy and International Law: An Environmental Perspective", in: BYIL, Vol. 60, 1989, pp. 257-313, at p. 259; Patricia W. Birnie and Alain Boyle, "International Law & the Environment", Clarendon Press. Oxford, 1992, at p. 368; Philippe J. Sands, "The Environment, Community and International Law", in: HILJ, Vol. 30, Issues 2, 1989, pp. 393-420, at p. 393.

[8] NEA, "Liability and Compensation for Nuclear Damage: An International Overview", OECD Paris 1994, pp. 105-106; Louise de La Fayette, "Towards a New Regime of State Responsibility for Nuclear Activities", in: NLB, No. 50, 1992, pp. 7-34, at pp. 10-18; Jillian Barron, "After Chernobyl: Liability for Nuclear Accidents under International Law", in: CJTL, Vol. 25, No. 3, 1987, pp. 647-672, at p. 648.

[9] During the first session of the IAEA General Conference which was held after the Chernobyl accident, a number of States presented proposals to revise the 1963 Vienna Convention on Civil Liability for Nuclear Damage and to develop a new convention on state liability for damage arising from nuclear accidents. In February 1989, the IAEA Board of Governors established a working group to discuss all the aspects of nuclear liability. In February 1990, this Board decided to dissolve the Working Group and established a new Standing Committee to tackle the matter. In its first session, the Standing Committee included in its considerations, the issues of international liability for nuclear damage including international civil liability, international State liability, the relationship between international and State liability and the problems related to the Vienna convention on civil liability for nuclear damage. See Report of Standing Committee on "Liability for nuclear damage", Vienna, 23-27 April 1990, SCNL/1/INF. 4, 2 May, 1990.

[10] Norbert Pelzer, "The Impact of the Chernobyl Accident on International Nuclear Energy Law", in: ADV/ eds. H. J. Schlochauer. I. Von Münch, O. Kimminich. W. Rudolf, Vol. 25, 1987, p. 295; Norbert Pelzer, "Focus on the Future of Nuclear Liability Law", in: OECD/NEA and IAEA, 2000, pp. 421-451, at pp. 436-439; Catherine Redgwell, "International Regulation of Energy Activities", in: Roggenkamp, Rønne, Redgwell, Guayo (eds.), 2007, pp. 13-96, at pp. 70-96.

Liability in the Field of Nuclear Energy (hereinafter the Paris Convention)[11] and the 1963 Vienna Convention on Civil Liability for Nuclear Damage (hereinafter the Vienna Convention)[12] constitute the basis of the present international regime of civil liability for nuclear damage. In addition to these two main conventions, other related instruments[13] cover the liability of the operator of a nuclear installation for nuclear damage caused by land-based nuclear reactor installations and by the transport of nuclear materials.[14] The

[11] Convention on Third Party Liability in the Field of Nuclear Energy, adopted under the auspices of the then OEEC, currently OECD/Nuclear Energy Agency on 29 July 1960, in Paris, entered into force on 1 April 1968, 956 UNTS 251 (1974). This regional Convention applies to the European countries which are the members of the OECD. The Convention was amended by the Additional Protocol to the Convention, which concluded at Paris on 28 January 1964 and entered into force on 4 December 1974, 956 UNTS 335 (1974), to harmonize its provisions with the provisions of the Vienna Convention. It was also amended by the 1982 Protocol to change in particular the unit of account to the Special Drawing Right of the International Monetary Fund. Finally, it was amended by the 2004 Protocol to Amend the Paris Convention to improve and harmonize its provisions with the 1997 Amended Vienna Convention.

[12] Vienna Convention for Civil Liability for Nuclear Damage, adopted on 21 May 1963 and entered into force on 12 November 1977 (Vienna Convention), IAEA Doc. *INFCIRC/500, 20 March 1996*, available also at: http://www.iaea.org/Publications/Documents/Infcircs/1996/inf500.shtml (accessed on 1.4.2012). See, Antonia Layard, "Nuclear Liability Damage Reform after Chernobyl", in: RECIEL, Vol. 5, Issue 3, 1996, pp. 218-224.

[13] There are also two other conventions relating to liability for damage caused by the transport of nuclear materials by sea and means of transport operated by nuclear reactors. These Conventions are the 1962 Brussels Convention on the Liability of Operators of Nuclear Ships, Brussels, May 25, 1962, available at: http://www.jstor.org/stable/2196215 (accessed on 1.4.2012). AJIL, Vol. 57, No. 1, 1963, pp. 268-278 and the 1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, adopted under the auspices of the IMO at Brussels on 17 December 1971 and entered into force on 15 July 1975. UNTS, Vol. 974, p. 255, also available at: http://www.admiraltylawguide.com/conven/carriagenuclear1971.html (accessed on 7.5.2011). In addition, a number of international bilateral agreements have been concluded in the field of nuclear energy, which govern liability for nuclear damage.

[14] See generally, IAEA, "Nuclear Law for a Developing World", Lectures Given at a Training Course, Vienna, 16-26 April 1968, IAEA Legal Series No. 5, IAEA Vienna 1969, pp. 107-180; Stojan Cigoj, "International Regulation of Civil Liability for Nuclear Risk", in: ICLQ, Vol. 14, No. 3, 1965, pp. 809-844, at p. 805; NEA, Liability and Compensation, 1994; OECD/NEA and IAEA, "Nuclear Accidents Liabilities and Guarantees", Proceedings of the Helsinki Symposium 31 August-3 September 1992, OECD Paris, 1993; OECD/NEA and IAEA, "Nuclear Third Party Liability and Insurance: Status and Prospects", Proceedings of the Munich Symposium, 10-14 September 1984, OECD Paris 1985; Messrs. A. Bette, J. M. Didier, R. Fornasier and R. M. Stein, "Compensation of Nuclear Damage in Europe: System Created by the Brussels Convention of

first step in improving this nuclear liability regime was the adoption of the 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, which linked the two Conventions, in order to expand the geographical scope of each convention to be applicable to nuclear damage caused by a nuclear accident in the territory of the Contracting Party of the other convention.[15] Another significant step forward in improving this liability regime was taken under the auspices of the IAEA on 12 September 1997; delegates from over 80 States adopted the Protocol amending the 1963 Vienna Convention[16] and a new Convention on Supplementary Compensation for Nuclear Damage.[17] Similar improvements were made with the conclusion of the 2004 Protocols amending the 1960 Paris Convention and the 1963 Brussels Supplementary Convention.[18]

While the existing conventions governing compensation for nuclear damage are based on the concept of the civil liability of the operator, the need for additional compensation provided by the State is broadly recognized in the 1963 Vienna Convention as amended in 1997, in the 1963 Brussels Supplementary Convention as amended in 2004 and in the 1997 Convention on Supplementary Compensation for Nuclear Damage which is a worldwide instrument.[19]

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the 31st January 1963 Supplementary to the Paris Convention of 29th July 1960 on Third Party Liability in the Field of Nuclear Energy", Brussels, 1965; IAEA, Legal Series, No. 8, 1972; Marina Spinedi and Bruno Simma, (eds.), "United Nations Codification of State Responsibility", Oceana Publications, New York, 1987; James C. Dow, "Nuclear Energy and Insurance", Witherby and Co. Ltd, London, 1989; R. Roman Hubáček, Miroslav Tvrznik, Frantisek Šuranský, "Recent Developments of Nuclear Legislation in the Czech Republic", in: Pelzer (ed.), 1995, pp. 197-202; Günther Handl, "Towards a global System of Compensation for Transboundary Nuclear Damage: Reflexions on the Interrelationship of Civil and International State Liability", in: NEA/OECD and IAEA 1993, footnote, at p. 510.

[15] See R. M. Stein, "The Legal System Applicable to the Carriage of Nuclear Matter as It Results from the Paris and Vienna Conventions", in: IAEA and OECD/NEA, 1970, pp. 23-39.

[16] See ILM, Vol. XXXVI, No. 6, 1997, at p. 1454. For the Consolidated Text of the Vienna Convention on Civil Liability for Nuclear Damage as Amended by the 1997 Vienna Convention Protocol see IAEA Doc. GOV/INF822/Add.1; GC(41)/INF/13/Add.1 of 23 September 1997; reproduced also by Horbach (ed.), 1999, at pp. 557-573.

[17] See Part I, SCNL/17.I/INF.7 and Part II, SCNL/17.II/INF.7.

[18] See NEA document, NEA/NE(2002)6/REV1.

[19] The 1997 Protocol to Amend the Vienna Convention and the 1997 Convention on Supplementary Compensation for Nuclear Damage adopted under the auspices of the IAEA in September 12, 1997. For the text of the instruments see, ILM, Vol. XXXVI, No. 6, 1997, at p. 1454.

The existing nuclear liability regime was certainly improved with the amendments of the nuclear liability conventions which, *inter alia,* covered environmental damage and recognized a wider role for State intervention to provide compensation for nuclear damage. However, this intervention is still governed by the civil liability regime and is limited to particular sums of compensation provided for under the conventions. The existing nuclear liability conventions cover only the liability of the operators of nuclear plants, and do not deal with the liability of the State for transboundary nuclear damage.[20] Consequently, there are a number of liability cases that are not covered by this civil liability regime alone. For example, these include the residual liability for transboundary environmental nuclear damage when the liability of the operator and State under the nuclear liability conventions has been exhausted, liability for damage caused as a result of disposing of radioactive waste and damage caused by military installations, as well as damage caused by accidents during the transport of radioactive material by sea where the material is transported from a State that is not a Contracting Party to the nuclear liability conventions. A legal framework for international liability for injuries from the present use of nuclear reactors is certainly necessary because the present liability regime is still inadequate.[21]

So far no treaty has comprehensively covered the issues of international liability. In the absence of an inter-state liability treaty applicable to transboundary environmental damage, liability will be governed by the general principles and traditional rules of liability under international law.[22] Unfortunately, these are not adequate to govern liability for environmental damage caused by major nuclear accidents. As demonstrated at the time of the Chernobyl accident, the existing traditional rules of international liability are neither comprehensive nor sufficiently well developed to cope with the legal problems arising from the use of new technologies.[23]

The need to develop the classical rules of State responsibility for its wrongful acts and international liability for damage caused by hazardous activities to meet the challenges of new technologies, such as nuclear energy and space activities, had already been highlighted by writers of international

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[20] U. V. Kadan, "Liability for Damage Caused by A Catastrophic Nuclear Accident", in: International Nuclear Law Association, 1995, pp. 553-564, at p. 557.

[21] Julia Schwartz, "Diplomatic Conference Convened to Adopt a Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage and to Adopt A Convention on Supplementary Compensation for Nuclear Damage", in: International Nuclear Law Association, 1998, at p. 425.

[22] Pelzer, 1994, at p. 272.

[23] Philippe J. Sands, "Chernobyl: Law and Communication", UK/North America/Australia and New Zealand, 1988, at pp. 5-6.

law even before the Chernobyl accident.[24] The doctrine of international law has emphasized the role of international liability for the protection of the environment.[25] The significant role of international case law in promoting rules and principles of international law, including rules of liability, was also recognized. As Jules Basdevant had already observed in 1936:

> 'Responsibility is an essential part of any juridical system. The effectiveness of a juridical system depends on whether it is more or less developed or more or less well structured. Responsibility may also serve as an instrument of legal development, as it provides guarantees against abuse: the remarkable development of French administrative law is partly due to the existence of administrative tribunals whose jurisprudence, in the absence of texts, has largely established the responsibility of the Administration itself – not only the personal and the ineffective responsibility of the administrative agents – for acts of abuse of which its subjects are victims.
>
> The theory of responsibility could serve the same function in the international system. Its degree of effectiveness and to some extent, the possibilities of the development of international law, depend on the place it is given'.[26]

In international law, decisions have been made in a number of international cases dealing with issues of international liability for damage caused by hazardous activities. These created certain primary obligations and principles governing prevention, reduction and reparation of damage caused by such

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[24] See generally, S. El Den Amer, "International Environmental Law", Cairo 1981/1982; A. O. Adede, "International Law from Stockholm to Rio-An Overview of Past Lessons and Future Challenges", in: EPL, Vol. 22, No. 2, 1992, pp. 88-105; A. O. Adede, "International Environmental Law Digest-Instruments for International Responses to Problems of Environmental and Development 1972-1992", sponsored by IEI, International Environment Institute Amsterdam; New York : Elsevier, 1993; A. C. Kiss, "Survey of Current Development in Environmental Law", International Union for Conservation of Nature and Natural Resources, Morges, Switzerland, 1976; Birnie and Boyle, 1992; Philippe Sands, "Principles of International Environmental Law", First Edition, Manchester University Press, New York, 1995; E. B. Weiss (ed.) "Environmental Change and International Law: New Challenges and Dimensions", United Nations University Press, Tokyo, 1992; Boyle, BYIL, Vol. 60, 1989, pp. 257-313; S. M. Fadel, "Development of the Rules of International Liability", in: ERIL, 1980, at p. 162; Norbert Pelzer, "The Impact of the Chernobyl Accident on International Nuclear Energy Law", in: ADV, 1987, pp. 295-311, at p. 300.

[25] Alexandre Kiss, "Present Limits to the Enforcement of State Responsibility for Environmental Damage", in: Francioni and Scovazzi (eds.), 1991, pp. 3-14.

[26] The quotation in the text is a translation of the original text by this author. Jules Basdevant, Règles Générales du Droit de La Paix, in: RDC, 1936, Vol. 58, Part. IV, pp. 471-692, at p. 656.

activities.[27] Such obligations can be found in the Trail Smelter Case between Canada and the United States (1941),[28] in the Corfu Channel Case between Albania and Great Britain (1949)[29] and in the Lac Lanoux Case between France and Spain (1957).[30] The principles established in these cases have become principles of international customary law and have been accepted by most of the doctrine of international law.[31] They should apply in nuclear liability cases. International liability could be incurred if such obligations have been breached by a State constituting a wrongful act, or if actual environmental damage has been caused by such hazardous activities, and the rules and conditions of the absolute liability are already in existence.[32] In its decision of 1997 concerning the Gabčikovo-Nagymaros Project Case between Hungary and Slovakia, the International Court of Justice (the ICJ) recognized the liability of both parties, as they had both breached treaty obligations between the two States. This is the first case in which the ICJ dealt with issues related to the environment and State responsibility in relation to breaching treaty obligations for environmental damage. In this Case, the Court decided that Hungary was responsible for its wrongful acts committed against Slovakia. As the Court stated, 'Hungary was not entitled to suspend and subsequently abandon, in 1989, the works on the Nagymaros Project and on the part of the Gabčíkovo Project for which the Treaty of 16 September 1977 and related instruments attributed responsibility to it'.[33] This judgement is one step in the development of the rules of international law concerning liability for environmental damage. This is because the respect of the State for its environmental obligations can also help to prevent environmental

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[27] For these obligations in general, see Günther Handl, "Transboundary Nuclear Accidents: The Post-Chernobyl Multilateral Legislative Agenda", in: ELQ, Vol. 15, 1988, pp. 203-248.

[28] RIAA, Vol. III, p. 1905.

[29] ICJ Reports 1949, p. 4.

[30] RIAA, Vol. XII, at p. 281. The award also appears in RGDDIP, Vol. 29, 1958, pp. 79-119.

[31] L. F. E. Goldie, "A General View of International Environmental Law - A Survey of Capabilities, Trends and Limits", in: La protection de l'environnement et le droit international: Colloque 1973, 14-16 VIII, (The Protection of the Environment and International Law: Colloquium 1973, 14-16 VIII), Hague Academy of International Law -Charles Kiss, 1975, pp. 25-143, at pp. 66-69; Frederic L. Kirgis, "Technological Challenge to the Shared Environment: United States Practice", in: AJIL, Vol. 66, No. 2, 1972, pp. 290-320, at p. 291; Sands, 1988, at p. 11.

[32] J. G. Lammers, "Pollution of International Watercourses: A Search for Substantive Rules and Principles of Law", Martinus Nijhoff Publishers, Boston/The Hague/Dordrecht/Lancaster, 1984, pp. 585-661.

[33] ICJ Reports 1997, at p. 82, para. 155.

damage caused by hazardous activities in the future. The vital role taken by the ICJ in promoting rules of international law[34] was clearly emphasized by Judge Robert Jennings, the former president of the ICJ, in his address to the UN Conference on Environment and Development in Rio de Janeiro in 1992. In his speech Judge Jennings highlighted the significant role of the Court decisions as a source of international law and the value of its reports as a contribution to the elaboration of the rules of international law.[35]

In fact, the real attempt to draw the attention of the international community to the need to improve the rules of international liability for environmental damage was made in the 1972 Stockholm Declaration on Human Environment.[36] This Declaration adopted primary obligations which oblige States to exploit their natural resources according to international law. Principle 21 of the Stockholm Declaration obliges a State to ensure that hazardous activities conducted within its territory or under its jurisdiction or control do not cause any damage to the environment of other States or the global

[34] In recent years the role of the ICJ in developing the rules of international environmental law has increased. On 19 July 1993, for instance, the Court established a Chamber of the Court for Environmental Affairs to follow the developments in the field of environmental law and to deal with international disputes related to the environment which fall within its jurisdiction. In addition, the opinion of judges has become more effective in addressing the recent issues of international law. These efforts reflect the development of the doctrine of international liability. See ICJ Communiqué No. 93/20, 19 July 1993; Chapter 39.10 of UNCED Agenda 21 and the Statement of Judge Robert Jennings to the UNCED, reproduced in ICJ Yearbook 1991-92, No. 46, pp. 212-218; Judge Raymond Ranjeva, L'environnement, la cour internationale de justice et sa chamber spéciale pour les questions d' environnement, in: AFDDI, XI, 1994, pp. 433-441; ICJ Reports 1995, Advisory Opinion for "Request an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the Nuclear Tests (New Zealand v. France) Case, the opinion of Judge Sir Geoffrey Palmer, pp. 405-413; Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 8 July 1996, ICJ Reports 1996, p. 226, Dissenting Opinion of Judge Weeramantry, at pp. 552-553.

[35] Robert Jennings, "The Role of the International Court of Justice in the Development of International Environment Protection Law", in: RECIEL, Vol. I, No. 3, 1992, pp. 240-244, at p. 241, reproduced in ICJ Yearbook 1991-92, No. 46, pp. 212-218.

[36] 11 ILM, 1972, at p. 1416. The Stockholm Declaration on the Human Environment was adopted by the United Nations Conference on the Human Environment, held in Stockholm on 5-16 June 1972. 113 States, 13 specialised organizations and several intergovernmental and non-governmental organizations participated in the Conference. The Declaration included 109 recommendations and 26 principles aimed at the protection of the global environment from pollution. The Declaration is not legally binding, but nevertheless, some of these principles, e.g., Principle 21, have now been accepted as customary international law. Edith Brown Weiss, Paul C. Szasz and Daniel B. Magraw, "International Environmental Law: Basic Instruments and References", Transnational Publishers, Inc., New York 1992, at p. 172.

commons.[37] Principle 22 of this Declaration encourages States to cooperate to develop rules of international law on the liability for environmental damage caused by such activities.[38] This means that rules of liability already ex-

[37] Louis B. Sohn, "The Stockholm Declaration on the Human Environment", in: HILJ, Vol. 14, 1973, at p. 493.

[38] Principle 22 of the Stockholm Declaration has been adopted in a number of international instruments which encourage States to cooperate in developing international liability law. See for instance, Article 10 of the 1972 International Convention on the Prevention of the Marine Pollution by Dumping of Wastes and Other Matter, (London, Mexico City, Moscow, Washington, 29 December 1972), available at: http://www.admiraltylawguide.com/conven/dumping1972.html (accessed on 13 .4.2012); Article 17 of the 1974 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area; Article 12 of the 1976 Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution; Article XIII of the 1978 Kuwait Regional Convention for the Cooperation on the Protection of the Marine Environment from Pollution, signed in Kuwait on 24 April 1978, available at: http://www.ehu.es/ceinik/tratados/20TRATADOSSOBREDERECHODELMAR/TDIM2023.pdf (accessed on 13.4.2012); Article 14 (2) of the 1979 UN Agreement Governing the Activities of States on the Moon and Other Celestial Bodies; Article 15 of the Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (Abidjan Convention), adopted in Abidjan in 1981, entered into force on 5 August 1984, available at: http://www.unep.org/AbidjanConvention/docs/Abidjan%20Convention%20English.pdf (accessed on 3.4.2012); http://www.unep.org/AbidjanConvention/The_Convention/Protocols/Convention_Text.asp (accessed on 3.4.2012); Article 11 of the 1981 Lima Convention for the Protection of the Marine Environment and Coastal Areas of the South-East-Pacific, concluded on 12 November 1981, entered into force on 19 May 1986, available at: http://www.cfr.org/chile/convention-protection-marine-environment-coastal-areas-south-east-pacific-lima-convention/p20595 (accessed on 13.4.2012); Article 235 of the 1982 UN Convention on the Law of the Sea; Article 14 of the 1983 Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region; Article 15 of the 1985 Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi Convention), signed on 21 June 1985, entered into force in 1986, available at: http://www.cfr.org/africa/convention-protection-management-development-marine-coastal-environment-eastern-african-region-nairobi-convention/p20590 (accessed on 13.4.2012); Article 12 of the 1989 (UNEP) Basil Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; Article 12 of the 1991 (OAU) Bamako Convention on the Ban of the Import Into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, done at Banko, Mali, January 29, 1991, 30 ILM 773 (1991); Article 16 of the 1991 Protocol on the Environment to the 1959 Antarctic Treaty; Article 7 of the Convention of the Protection and Use of Transboundary Watercourses and International Lakes, done at Helsinki, March 17, 1992, 1936 U.N.T.S. 269; Article 13 of the 1992 UN/ECE Convention on the Transboundary Effects of Industrial Accidents; Article 14 (2) of the 1992 UNCED Con-

ist, but it is necessary to improve the existing legal system of liability to meet recent technological advances and to cover damage caused by such new technologies.[39] The rules of liability adopted by the Stockholm Declaration were an attempt to encourage States to develop rules of liability for environmental damage.[40] This is particularly important with regard to environmental nuclear damage which often crosses the boundaries of States.[41] Principle 21 of the Stockholm Declaration was also reflected in the 1992 Rio Declaration of the United Nations Conference on Environment and Development (UNCED). Principle 2 of the Rio Declaration almost literally repeats the language of Principle 21 of the Stockholm Declaration.[42] At present, these principles are considered principles of customary international law regarding the protection of the environment from the hazards arising from hazardous activities, as adopted in many international instruments. Nevertheless, the application of the principles to the issues of international liability for environmental damage as customary international law is still ambiguous and unclear in practice. It was considered that 'the formulation of Principle 21 can provide little or no support in favor of any specific theory of liability, let

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vention on Biological Diversity; Article 25 of the 1992 Helsinki Convention of the Protection of the Marine Environment of the Baltic Sea Area; Article XVI (4) of the Bucharest Convention on the Protection of the Black Sea Against Pollution, signed in a diplomatic conference of Bulgaria-Georgia-Romania-Russian Federation-Turkey-Ukraine in Bucharest on 21 April 1992, entered into force in 1994, 32 ILM 1101 (1993), available at: http://www.blacksea-commission.org/_convention-fulltext.asp (accessed on 3.4.2012); Article 3 (1) of the 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, concluded in Aarhus, Demark, on 25 June 1998 (Aarhus Convention); Article 27 of the 2000 Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal 29 January 2000, Treaty Series, No. 17 (2004); Article 19 of the 2003 World Health Organization Framework Convention on Tobacco Control, as updated in 2004 and 2005, available at: http://whqlibdoc.who.int/publications/2003/9241591013.pdf (accessed on 18.4.2012); Article XXIV of the 2003 African Convention on the Conservation of Nature and Natural Resources, adopted at Maputo on 11 July 2003, available at: http://www.ecolex.org/ecolex/ledge/view/RecordDetails?id=TRE-001395&index=treaties (accessed on 18.4.2012).

[39] R. P. Dhokalia, "Imperatives of New International Law and Expanding Dimensions of State Responsibility", in: TA, Vol. XX, 1993, at p. 257; Sohn, HILJ, Vol. 14, 1973, at p. 493.

[40] Sohn, HILJ, Vol. 14, 1973, at p. 495.

[41] Fadel, ERIL, 1980, at p. 162.

[42] For the UN Rio de Janeiro Declaration on Environment and Development, see Report of the United Nations Conference on Environment and Development, 1992, UN Doc. A/CONF.151/26, Vol. I, 3-14; 31 ILM 874 (1992).

alone a form of liability that is dependent on a link of causation in fact as the only prerequisite'.[43]

Moreover, there is one European liability Directive[44] which covers liability for environmental damage caused by occupational activities and which also refers to a number of liability directives.[45] This Directive established the framework of liability for environmental damage according to the "polluter pays" principle.[46] However, it does not apply to environmental damage caused by nuclear activities when the European Atomic Energy Community (EURATOM) Treaty and the nuclear liability conventions are applicable.[47] In addition, even though the directives apply to environmental damage, they include principles of liability which conflict with those in the nuclear liability conventions. This allows the operator to avoid liability when the victims fail to prove that he caused the damage, or was negligent or acted in conflict with the provisions of the Directives. Moreover, they do not limit the liability of the operator of the activity, nor oblige him to maintain financial security.[48]

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[43] Günther Handl, "Balancing of Interests and International Liability for the Pollution of International Watercourses: Customary Principles of Law Revised", in: CYIL, 1975 pp. 156-194 at p. 161. Reprinted by Anthony D'Amato and Kirsten Engel (eds.), International Environmental Law Anthology, Anderson Publishing Company, Anderson Publishing Company, Cincinnati, Ohio, 1996, pp. 93-151, at p. 107.

[44] Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on Environmental Liability with regard to the Prevention and Remedying of Environmental Damage. (OJ L 143 of 30.4.2004, p. 56).

[45] For instance see, Council Directive 79/409/EEC of 2 April 1979 on Conservation of Wild Birds (OJ L 25.4.1979, p. 1), 1979L0409— EN— 01.01.2007 — 006.001— 2, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1979L0409:20070101:EN:PDF (accessed on 26.4.2012); Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (OJ L 206 of 22.7.1992, p. 7), 1992L0043— EN— 01.01.2007 — 005.001— 1, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992L0043:20070101:EN:PDF (accessed on 26.4.2012); Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 on Establishing a Framework for Community Action in the Field of Water Policy (OJ L 327 of 22.12.2000, p. 1), available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF (accessed on 26.4.2012).

[46] Eliana Danzi, "Some Reflections on the Exclusion of Nuclear Damage from the Scope of the Environmental Liability Directive", in: Pelzer (ed.), 2010, pp. 191-212, at p. 192.

[47] Article 4 (4) and Annex V of the Directive 2004/35/CE.

[48] Johan G. Lammers, "New Developments Concerning International Responsibility and liability for Damage Caused by Environmental Damage", in: HYIL, Vol. 19, 2006, pp. 87-112, at pp. 93-96.

Finally, reference should be made to the significance of the work of the International Law Commission of the United Nations (ILC) on the codification of international law of liability and the responsibility for developing the rules of international liability in general, and with regard to those for environmental damage caused by hazardous activities tolerated by international law in particular.[49] After more than fifty years of examination, the ILC has succeeded in the past decade in concluding the codification of the general principles of law and customary international law related to the questions of international liability. The work of the ILC on the examination of these topics is the real development of the law of international liability, rather than the codification of its rules. As the Special Rapporteur Rao argues: 'The draft Articles on prevention should be treated as a progressive development of international law, particularly in respect to obligations concerning the management of risk and engagement between States of origin and States likely to be affected'.[50] The topics of international liability developed by the ILC could apply for the protection of innocent victims and the environment from nuclear damage. They could not only apply for reparation of nuclear damage, as expressed in the classical ideas of liability, but also as comprehensive rules of liability that can prompt States to take all the necessary measures to prevent, reduce and repair the harmful consequences of a nuclear accident. This view is reflected in the ILC Draft Articles adopted on State responsibility for its wrongful acts and those related to international liability for injuries arising from acts not prohibited by international law.

1.4 Motivation for the research and review of the literature

An important motivation for the researcher in selecting the subject of this study was to look for solutions to the remaining nuclear liability problems, as the issues of State liability for environmental damage caused by nuclear

[49] Draft Articles on Responsibility of States for Internationally Wrongful Acts adopted by the International Law Commission at its fifty-third session (2001), Report of the International Law Commission on the work of its fifty-third session, Official Records of the General Assembly, Fifty-six session, Supplement No. 10, (A/56/10), chapter IV.E.1; Draft Articles on Prevention of Tansboundary Harm Caused by Hazardous Activities, Report of the International Law Commission on the work of its 53rd session, UNGA Official Records, Supplement No.10 (A/66/10), pp. 370-436; Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities, with commentaries in 2006, and submitted to the General Assembly (A/61/10).

[50] Pemmaraju Sreenivasu Rao, "Prevention of Transboundary Harm from Hazardous Activities– A sub-topic of international liability –", in: EPL, 32/1 (2002), pp. 27-28, at p. 28.

activities have not been resolved. Moreover, due to the decline in traditional fuels and the economic advantages, the use of nuclear reactors to generate power will be an issue for many countries in the future, particularly the developing countries, and more liability problems are anticipated. Moreover, the study will fill the gaps in the literature on international nuclear liability. The relevant research questions have not been dealt with adequately in the body of literature. A review of the existing literature and sources of research material by the author revealed that there are relatively few studies on any aspect of this field. In fact, none of the literature comprehensively covers the issues of international liability for environmental damage caused by nuclear activities. It is worth mentioning that since the revisions of the nuclear liability conventions in 1997 and 2004, only a few studies have been carried out on the subject of international liability for environmental damage.[51] These studies examined the issues of international liability for environmental damage under public international law in general. None of them comprehensively covered international liability for environmental damage caused by nuclear facilities. This research intends to provide a comprehensive and analytical study of international liability for environmental nuclear damage resulting from the use of nuclear reactors, based on the liability of the operator of a nuclear installation and the Installation State. A comprehensive regime of liability to govern the issues of liability for damage caused by hazardous activities and the role of the State in sharing liability with the operator for damage caused by such activities was actually drawn up by the Working Group which was established by the ILC in 2002 to review the relevant aspects of international liability for ultra-hazardous activities.[52] According to

[51] For some relevant and recent books in the field of international liability and environmental damage, see: Marie-Louise Larsson, "The Law of Environmental Damage: Liability and Reparation", Kluwer Law International & Norstedts Juridik, The Hague and Stockholm, London, Boston 1999; Rüdiger Wolfrum and Christine Langenfeld et al., "Environmental Protection by Means of International Liability Law", Erich Schmidt Verlag GmbH & Co., Berlin 1999; Nathalie Louisa Johanna Theodora Horbach, "Liability Versus Responsibility under International Law: Defending Strict State Responsibility for Transboundary Damage", PhD thesis University of Leiden, the Netherlands, 1996; René Johannes Maria Lefeber, "Transboundary Environmental Interference and the Origin of State Liability", Kluwer Law International, The Hague/London/Boston, 1996; Phoebe N. Okowa, "State Responsibility for Transboundary Air Pollution in International Law", Oxford University Press, New York, 2000; James Crawford, Alain Pellet, and Simon Olleson (eds.), "The Law of International Responsibility", Oxford University Press, New York, 2010.

[52] See: United Nations, International Law Commission, Report on the work of its fifty-fourth Session (29 April-7 June and 22 July-16 August 2002) General Assembly, Official Records, Fifty-Seventh Session, Supplement No. 10 (A/57/10), at p. 223, para. 441.

the report of the Working Group, the operator bears primary responsibility for damage caused by ultra-hazardous activities in any regime of liability because he has a direct control over the operation of the activity.[53] However, that liability should be limited by the available amount of insurance or his own financial resources in order to give the operator the chance to survive as an operator.[54] The State also shares the liability with the operator because it is responsible for the implementation of appropriate international and national legal regimes of liability and for ensuring equitable and adequate compensation for the victims.[55] The greater hazards involved with nuclear energy certainly justify moving the liability from the operator to the State.[56] Finally, the concept of international liability for environmental nuclear damage has not yet been defined in international law and continues to be a controversial issue within the doctrine of international law. Given the fact that nuclear power is generated increasingly to reduce carbon-based energy, a systematic study of the subject has therefore now become important.

1.5 The main research questions

This study considers whether international law imposes upon States any obligation to prevent, reduce and repair environmental damage caused by nuclear accidents. If such an obligation exists and a nuclear accident causes transboundary environmental damage, is the State liable for repairing the damage? If so, what is the extent of its liability? What standards of care apply and what is the liability based on? Can the liability of a State arise from the fact of the damage alone, or it does it arise only from its failure to meet the internationally accepted standards of conduct? What are the legal consequences of liability? These questions are also related to other issues such as attributing liability to a State for damage caused by private activities if the operator has failed to fulfil its financial obligations, the type of damage to be compensated, etc.[57] These are the fundamental questions the thesis will address.

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[53] See: United Nations, International Law Commission, Report on the work of its fifty-fourth Session (29 April-7June and 22 July-16 August 2002) General Assembly, Official Records, Fifty-Seventh Session, Supplement No. 10 (A/57/10), at p. 225, para. 451.
[54] Ibid, at p. 226, para. 454.
[55] Ibid, at p. 226, para. 455.
[56] C. Wilfred Jenks, "Liability for Ultra-Hazardous Activities: International Law", in: RDC, Vol. 117, Part I, 1966, pp. 99-200, at p. 178.
[57] Barron, CJTL, Vol. 25, No. 3, 1987, at p. 650; Sands, 1988, at pp. 5-7. "Complexity of the subject matter is further compounded by difficult questions of meaning of nuclear damage, causality, latent nuclear damage, etc." See U. V. Kadan, 1995, at p. 557.

1.6 Methodology

To investigate the matter, the thesis will adopt an analytical approach. Methodologically, it carries out an analysis of the provisions of the existing nuclear liability conventions and other sources of international law which deal with liability and compensation for environmental nuclear damage with a view to clarifying and defining the liability of a State to prevent, reduce and repair the incidence of environmental nuclear damage caused by reactor accidents. Treaties are the most important source in the domain of international environmental and nuclear law, as all environmental and nuclear issues have been addressed in conventions and regulations. However, in the absence of a convention on international liability for nuclear damage, there are rules which apply in similar cases under the general principles and the traditional rules of international law, particularly those arising from international judgements and decisions. The study also touches upon the similarities and dissimilarities between the conventions and the judgements. The main basis of the analysis and the conclusions will be deductive reasoning.

The main sources of data for this study are treaties, literature, judicial decisions, decisions and recommendations of international organizations such as the work of the IAEA, the NEA, EURATOM, the ILC, UN General Assembly, as well as other primary and secondary data sources in the field of nuclear liability and related fields.

We will study the data collected from relevant treaties and State practice in an analytical search for patterns and interrelationships as a useful predictive tool. We will arrive at conclusions by determining the applicable rules for the liability of a State in the case of a nuclear accident that has caused transboundary environmental nuclear damage to other States. To reach this conclusion, the issues of nuclear liability will be studied, as organized in the following section, in an analysis of the primary and secondary factual pieces of evidence collected by the researcher.

1.7 Structure and organization of the study

The study is organized in four parts, and divided into ten chapters, including this chapter which summarizes the various aspects of international liability for environmental damage caused by peaceful nuclear activities and presents the research subjects. Part I also includes chapters 2 and 3 which define transboundary environmental damage caused by major nuclear accidents and its relationship with international liability. Chapter 2 provides the factual background and a description of the major nuclear accidents that have occurred since nuclear reactors have been used. It outlines the nature and char-

acteristics of transboundary environmental nuclear damage and shows the amount of damage that can be caused by a nuclear accident to which the rules of international liability apply. Chapter 3 defines the legal concept and the scope of the environmental nuclear damage for which reparation can be made. This definition is necessary to establish and determine the scope of liability for nuclear damage. Liability cannot be established unless the environmental nuclear damage was caused by nuclear activity. Finally, the terms "damage" and "accident" in the title of the study were used by jurists of international law in a confusing way. This causes misunderstandings of the subject matter and the concept of international liability. To remove this ambiguity, the related chapters of this part of the study provide a definition and clarification of these terms, as defined by the doctrine of international law.[58]

Part II comprises chapters 4 and 5, which investigate the primary obligations imposed upon the State to prevent and minimize environmental nuclear damage as a preventive function of international responsibility. Chapter 4 examines the legal basis of the obligation to prevent and reduce damage as an essential State responsibility for environmental damage caused by nuclear activities under the general rules of international law. It examines three issues. It clarifies whether the principle of prevention is a general norm or a general principle or a customary international law principle, and examines the legal basis of the principle of prevention and the principle of cooperation between States to prevent and reduce environmental nuclear damage. Chapter 5 discusses the procedural rules and obligations under international law for the construction of a nuclear installation and its operation to prevent and reduce environmental damage. These obligations are based on the principle of pre-

[58] In terms of the terms which appear in the title of the study, the term "responsibility" is used to indicate State responsibility for wrongful acts and the term "liability" is used to indicate State liability for lawful acts. These two terms are used in this study because nuclear activities are lawful activities and liability for damage caused by such activities is based on risk liability. However, a breach of the rules regulating these activities constitutes unlawful responsibility. This approach was taken by the ILC and majority of the doctrine of international law. Furthermore, the term "environment" is used rather than the term "milieu humain" because this was agreed by the States during the 1972 Stockholm conference. Moreover, the term "damage" is used rather than the terms injury, harm, impair, impact, affect etc., because it is term most often used by the nuclear liability conventions and other instruments. Finally, the term "accident" is used rather than the term "incident", which is used by the nuclear liability conventions because the technical reality, as adopted by International Nuclear Event Scale which was prepared by a Group of Technical Experts from the IAEA and the NEA, and other international instruments indicate that the term "accident" means that serious and transboundary damage is caused by a nuclear event, while the term "incident" means that minor damage is caused by a minor nuclear event.

vention and reduction of environmental damage. If these obligations are breached, the State is responsible for wrongful acts. The examination covers two aspects, the obligations of the State before the occurrence of a nuclear accident and the obligations of the State after the occurrence of a nuclear accident. The first includes the obligations of the Installation State to ensure the safe operation of a nuclear installation, for example, by enforcing a regulatory regime, designating the liable operator, carrying out an environmental impact assessment, and taking care of the issues of nuclear safety of a nuclear installation. It also includes the obligations of the Installation State, other States and international organizations to provide the necessary information to prevent and reduce damage caused by a nuclear activity. These may include, for example, providing prior notification in the case of the construction of a nuclear installation, consultation, negotiation, exchange of information and providing information to the public. The second aspect examines the obligations of States after a nuclear accident to provide early notification and assistance under the general rules of international law and the 1986 conventions on early notification and assistance in case of a nuclear accident.

Part III comprises chapters 6, 7, 8 and 9, which deal with State responsibility and liability for environmental damage caused by a nuclear accident under the general rules of international law as a function of international liability to make reparation. Up to now, liability for nuclear damage has been governed by international conventions which cover the liability of the operator, and also by the traditional rules of liability under international law which govern the liability of a State for nuclear damage. The aim of chapter 6 is to determine the applicable regime of liability and the person who is liable for the damage, to make a distinction and determine the relationship between civil liability and international liability for environmental nuclear damage, and to investigate whether there is a possibility of integrating the two regimes of liability in a single unified regime. In practice, as well as in theory, there is some confusion about the relationship between the two regimes in relation to liability for environmental nuclear damage. The chapter examines both aspects. It examines whether or not there is an obligation on the State to intervene and to repair the environmental damage caused by nuclear activities and examines the nature of nuclear liability. This determines whether or not such liability should be based on civil or international law, or on both. Chapter 7 provides an analysis of State responsibility for its wrongful acts according to the general rules of international law in the case that it has breached the nuclear liability conventions or principles of international law or has omitted to perform its obligations under them. This will help to establish the liability of the State in the case of a violation of the obligations with

regard to preventing, minimizing and redressing the incidence of environmental damage caused by a nuclear accident. Since the liability for damage caused by lawful nuclear activities not prohibited by international law is based on absolute liability, chapter 8 examines the basis and origin of the objective liability of a State for environmental nuclear damage caused by such activities. This liability is based on actual damage caused by a hazardous activity, irrespective of any fault or negligence on the part of the party that caused the damage. Chapter 9 discusses the legal consequences of the failure of a State to observe its environmental and nuclear obligations under international law and in the case of the occurrence of a nuclear accident causing transboundary environmental damage where these obligations have not been violated. The consequences of the liability could be the cessation of the nuclear activity concerned, for example, in the event of the violation of international safety standards, or the reinstatement of the damaged environment to its *status quo ante*, or providing an official apology to the injured State if the damage is limited, or providing compensation for environmental damage caused by the nuclear accident. As liability for damage caused by lawful activities is based on the idea of absolute liability, the only consequence of liability is compensation for damage caused by the accident.

Finally, Part IV provides summary conclusions drawn from the various chapters of the study and recommendations which are included in chapter 10 of the study. It concludes that the rules of liability for environmental nuclear damage as presented in the study constitute a comprehensive international liability regime which serves to prevent, reduce and redress nuclear environmental damage caused by a nuclear accident.

PART I:

ENVIRONMENTAL DAMAGE CAUSED BY MAJOR NUCLEAR ACCIDENTS AND ITS RELATIONSHIP WITH INTERNATIONAL LIABILITY

Introduction

Liability in any legal system always starts with damage and ends with compensation or reparation. Liability cannot be incurred in the absence of damage.[1] As Georges Scelle argues, '[t]he concept of liability starts with damage and ends with reparation. Between the two, the intermediate mechanism of the positive rule of law will determine what damages will be repaired, by whom and in what proportion. There is no necessary link between the point of departure and the point of arrival'.[2] Thus the element of damage is considered one of the important elements in international liability for environmental damage caused by nuclear activities. In risk liability or liability for lawful activities, damage is an essential element required for attributing the liability to the State or the operator of a hazardous activity. Liability for nuclear damage caused by a nuclear activity is established by the mere fact of a nuclear activity causing actual damage, without the need to prove fault or negligence on the part of the State or the operator liable for the activity. Equally, in responsibility for a wrongful act, responsibility and damage follow from a State breaching its obligations under international law. These concepts were expressed by García Amador, the first ILC Special Rapporteur on the topic of international liability, in his lecture at The Hague Academy of International Law at the end of 1950s. He argued that:

> 'In effect, should the "risk" theory be carried to its ultimate and logical consequences, the causing of the injury could by itself alone give rise to the duty to make reparation; for such a duty would exist even in cases where the injury has resulted from acts or omissions performed in the exercise of a right'.[3]

The element of damage is also one of the main factors in distinguishing between international liability for lawful and unlawful activities under interna-

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[1] Bernhard Graefrath, "Responsibility and Damages Caused: Relationship between Responsibility and Damages", in: RDC, Vol. 185, Part II, 1984, pp. 9-150, at p. 107; Juraj Andrassy, Les relations internationales de voisinage, in: RDC, Vol. 79, Part II, 1951, 73-182, at p. 111; In the case concerning "The Marrommatis Jerusalem Concessions", the claim for indemnity was dismissed by the PCIJ because there no damage was proved. See the Marrommatis Jerusalem Concessions, the Government of the Greek Republic v. His Britannic Majesty's Government, 26 March, 1925, PCIJ Reports, Series A, No. 5, 1925, at p. 51.

[2] The translation of this quotation is by the author. Georges Scelle, Manuel de droit international public, Editions Domat-Montchrestien, Paris, 1948, at p. 909.

[3] Francisco V. García-Amador, "State Responsibility: Some New Problems", in: RDC, Vol. 94, Part II, 1958, pp. 365-491, at p. 389.

tional law.[4] This is because the requirement for the existence of damage in risk liability is different from the requirement in liability for a wrongful act. The doctrine of international law agrees that the element of damage in liability for lawful activities is a constituent element required to incur the liability, which relies upon material and immaterial damage caused by the activity concerned. However, the element of damage is still a controversial issue in the system of international liability with regard to the liability of a State for wrongful acts, as material damage is not necessarily a constituent element. Damage resulting from a breach or omission of an international obligation by a State can be caused without material damage being suffered. The element of damage in this case is moral damage,[5] which is considered an element of international liability or at least one of the main conditions constituting State responsibility for wrongful acts.[6] This is the so-called legal damage or moral damage, which results from the violation of a legal right by a State vis-à-vis other States.[7] Consequently, in practice there are difficulties in identifying the responsibility of the State for environmental damage caused by a nuclear activity in the case of a violation of international law, as in the case of the Chernobyl accident.[8]

Damage caused by nuclear activities is defined by the nuclear liability conventions and in general by the ILC in its Draft principles on the allocation of loss.[9] However, legal damage as a result of the violation of international obligations is dealt with under the general rules of international law as adopted by the ILC Draft Articles on State Responsibility for Wrongful Acts. The position is not entirely clear as regards compensable transboundary environmental nuclear damage in the nuclear liability conventions and the ILC Draft Articles on international liability. This is because nuclear damage is defined without determining the scope and extent of compensable nuclear damage. The same applies with regard to the concept of legal damage, which is still vague and not wholly accepted in international law as a

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[4] S. M. Hashim, "International Responsibility for Breach of the Marine Environment", Cairo, Arabic Edition, 1991, at p. 448.

[5] G. Handl, "Territorial Sovereignty and the Problem of Transnational Pollution", in: AJIL, Vol. 69, No. 1, 1975, pp. 50-76, at p. 51.

[6] Attila Tanzi, "Is Damage A Distinct Condition for the Existence of An Internationally Wrongful Act?" in: Spinedi and Simma (eds.), 1987, pp. 1-33, at p. 12; Hashim, 1991, at p. 118.

[7] Tanzi, 1987, at p. 2.

[8] Céline Nègre, "Responsibility and International Environmental Law", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 803-813, at p. 805.

[9] Article 2 of the 2006 Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities, YILC, 2006, Vol. II, Part Two, UN Doc. (A/61/10)

constituent element in the liability of a State for its wrongful acts.[10] The element of damage in international liability is considered one of the most complicated issues in international law and has attracted attention during the debates on the topic of international liability within the ILC as well as in discussions between the scholars.

This part of the study examines and identifies the concept and scope of reparable environmental damage caused by major nuclear accidents, and its relationship with international liability. This will be examined in chapter 3 of the study. However, before proceeding with a legal analysis of the subject matter it will be useful to provide some factual background and a description of the major nuclear accidents caused by nuclear reactor installations in the following chapter. This will demonstrate the risks and harmful consequences of a major nuclear accident result from nuclear activity, and the type of damage covered by international law.

[10] YILC, 1970, Vol. II, Doc. A/CN.4/233, at p. 194, para. 53.

2 MAJOR NUCLEAR ACCIDENTS: FACTUAL BACKGROUND

2.1 Introduction

A large number of nuclear accidents occur during the daily operation of nuclear reactor installations, the transport of nuclear substances and other applications of nuclear activities, such as nuclear-powered ships. Such accidents may occur as a result of defective equipment, or defects in other components in a nuclear power plant, or for any other reason when nuclear activities are carried out. The majority of these accidents are minor accidents, which may not result in any serious damage to human beings and the environment, and have only a minor impact on the workers in the installations. However, in the case of a major nuclear accident caused by these activities, it poses a danger to many countries both near and far and contaminates the environment as well as the atmosphere.

Among the accidents caused by nuclear reactor installations a few had serious transboundary consequences for people, property and the environment, and gave rise to particular concern in the international community (see chapter 1). These accidents will be examined in section 2.3 of this chapter. Section 2.4 provides a summary of the types of nuclear accidents, and classifies these accidents in relation to the concept of the geographical scope of application of the nuclear liability conventions. Finally, section 2.5 concludes that this classification of nuclear accidents is important to determine the limits of the application of the nuclear liability regime. However, before proceeding with examining these issues, section 2.2 defines the concept of the terms "incident" and "accident" in order to indicate which term is relevant in this study.

2.2 Nuclear incident or nuclear accident

The term nuclear "incident" has been adopted in the nuclear liability conventions rather than the term nuclear "accident" to express the concept of a "nuclear event". However, in practice, particularly in the field of nuclear technology, and in nuclear liability law, the two terms "incident" and "accident" sometimes express the same concept of a nuclear event, while at other times they are used to refer to two different notions. Thus there is disagreement in the literature about the exact definition of a "nuclear event". The term "incident" as adopted in the nuclear liability conventions has also been used in

some of the literature. It was argued that the term "incident" was used in the English text rather than the term "accident" in order to cover both major and minor events as referred to in the Paris Convention.[1] In other literature, the two terms "incident" and "accident" have been used for different concepts. This differentiation in the use of the two terms leads to some ambiguity and confusion in the definition of the concept of a nuclear event. In the absence of a consensus about the definition, every State will, of course, define the concept of a nuclear event in accordance with its own language. Consequently, the definition of the concept of a nuclear event will differ from one country to another. At the same time, using the two terms, "incident" and "accident", reflects the wide-ranging concept of a nuclear event, and the extent and scope of liability. This may raise the question of the convenience of using the term "nuclear incident" as adopted in the nuclear liability conventions to express the reality of the concept of a nuclear event.

According to the technical terminology adopted by the IAEA International Nuclear Event Scale, the two terms, "incident" and "accident" express different notions.[2] The term "incident" expresses a minor event in a nuclear installation, which usually occurs during the normal everyday routine operation of a nuclear installation. Such events involve a lower level of radioactivity and have no serious consequences. The harmful consequences of these events are limited only to property and workers inside the installation, and are easily overcome without the need for any international assistance. On the other hand, the term "accident" refers to a major event in a nuclear installation. Such events cause serious damage not only inside the nuclear installation, but also outside the installation, and the consequences can extend beyond the national borders of the State in whose territory the event occurred. They involve high levels of radioactivity that can be considered a nuclear catastrophe. In such events, the Accident State may request international assistance from the international community or international organizations, in

[1] NEA, Liability and Compensation, 1994, at p. 46.

[2] After the Chernobyl accident, The International Nuclear Event Scale was prepared by a Group of Technical Experts from the IAEA and the NEA. This Scale is to be used in the case of the need for prompt communication and assistance and to indicate the level of notification in the case of a nuclear accident. Events are classified on a scale of seven levels: levels 1–3 are called "incidents" and levels 4–7 "accidents". The scale is designed so that the severity of an event is about ten times greater for each increase in level on the scale. Events without any safety significance are called "deviations" and are classified as level 0. According to the Scale, level 1 is (normal), level 2 (incident), level 3 (serious incident), level 4 (accident with local consequences), level 5, (accident with wider consequences, level 6 (serious accident) and level 7 (major accident). The International Nuclear and Radiological Events Scale (INES), http://www.iaea.org/Publications/Factsheets/English/ines.pdf (accessed on 26.2.2012).

order to prevent and to minimize the harmful consequences of the nuclear accident. The IAEA Scale clearly makes a distinction between the everyday routine events occurring during the normal operation of a nuclear installation, and major and unexpected events occurring in nuclear installations.

The concept of a nuclear event, as presented in the IAEA Scale, has been reflected in practice in the formulation of several international instruments in the nuclear field. For example, the term "accident" was adopted in the title of the 1986 Conventions on the early notification and assistance in the event of a nuclear accident.[3] These Conventions oblige the Contracting States to make notification of a major nuclear event occurring in a nuclear installation, and provide assistance to deal with any harmful consequences. Moreover, according to the Peace and Nuclear War Dictionary:

> 'There is [a] distinction between a nuclear accident and nuclear incident. Whereas a nuclear incident may cause a long-term hazard, a nuclear accident poses an immediate danger to life and property. An incident in a nuclear power plant could release enough radiation to kill thousands of people and contaminate cities, land, and water for decades. Both nuclear incidents and accidents are commonly referred to as accidents'.[4]

In fact, the distinction between the two terms, "incident" and "accident", corresponds with the purpose of the nuclear liability conventions. This is because nuclear damage caused by minor activities is excluded from these conventions. Therefore, the term "incident" should be used by the Conventions to express a minor nuclear event which involves minor harmful consequences, while the term "accident" should be used to express a major nuclear event which involves serious harmful consequences. These definitions should be adopted in the nuclear liability conventions in future amendments. Otherwise the conventions should adopt the two terms, "incident" and "accident", and indicate that the two terms express the same concept. These conventions cover nuclear damage caused by a major nuclear event, rather than that caused by a minor event, which has been left to be covered by national law. Therefore, the notion of a nuclear incident as adopted in the nuclear liability conventions is misleading. This is because the term "incident" does not reflect a sudden and unexpected nuclear event as indicated in the IAEA

[3] The Convention on the Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident and Radiological Emergency, the two Conventions were adopted on 26 September 1986. See IAEA Doc. INFCIRC/335 and IAEA Doc. INFCIRC/336, respectively. They were also reproduced in: http://www.iaea.org/Publications/Documents/Infcircs/Others/inf335.shtml and http://www.iaea.org/Publications/Documents/Infcircs/Others/inf336.shtml

[4] Sheikh R. Ali, "The Peace and Nuclear War Dictionary", ABC-CLIO, Santa Barbara, California, Oxford, England, 1989, at p. 170.

Scale of Nuclear Events, while the term "accident" corresponds to the technical reality in the nuclear field.[5] On the other hand, if the two terms, "incident" and "accident", are adopted in the nuclear liability conventions, this will lead to problems with regard to finding similar words for the two terms in languages other than English, such as French[6] and Arabic, which contain only one word to express the two terms, "accident" and "incident". This leads to confusion in the literature between the words "incident" and "accident", used in the English language to interpret and explain the concept of a nuclear event. In his 1994 Report to NEA Steering Committee, Strohl argued that:

> 'It has to be acknowledged that in this connection the Paris Convention raises a problem of terminology which stems from the time at which it was written; the English text is certainly less crisp because the word "incident" does not necessarily carry with it the meaning of a sudden and fortuitous event. The Vienna Convention appears to have circumvented this problem to some extent, starting by defining "nuclear damage" in a similar way to the Paris Convention, but then using the term "accident" to qualify the occurrence or succession of occurrences causing the damage; hence the difference is merely apparent.
>
> Today the French word "accident" would perhaps be replaced by "évènement" - which becomes "incident" in English – making clear that it may be "instantaneous or continuous", like the recent Convention of the Council of Europe on civil liability for damage resulting from activities dangerous to the environment; we may also note that chemical pollution can have the same gradual character as the effects of ionizing radiations. Also the French expression "évènement nucléaire" would not be very satisfactory. In fact it is quite natural, in the spirit of the time and in the absence of any better agreed terminology, that the authors of the Paris Convention should have used the ordinary vocabulary of third party law, while adopting a somewhat unorthodox meaning of the term 'accident' (in French) which nevertheless conforms to technical reality in the nuclear field. This semantic consideration – particularly sensitive in the French version – *does not cast any doubt on the definition itself*'.[7]

To avoid such confusion, in the absence of common agreement on the use of a single term for the concept of a nuclear event, the study adopts the same language as that adopted in the technical reality in the IAEA Scale of Nuclear Events. The term "accident" will be used in the sense of a nuclear

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[5] Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy, "Determination of A Liability Regime Applicable to the Long Term Storage and Final Disposal of Radioactive Waste", Note by the Secretariat, NEA/LEG/DOC(94)1, at p. 25.

[6] Ibid, at p. 25.

[7] Ibid, at p. 25.

event, and the term "incident" as defined in the Conventions covers a nuclear event.

2.3 Major nuclear accidents

2.3.1 The Windscale accident

This accident occurred in the Windscale nuclear power plant at Sellafield on the Cumbrian Coast in England, in October 1957. It was the first serious accident caused by a nuclear reactor installation, since nuclear reactors had been used for peaceful purposes. This plant was constructed after the Second World War for peaceful purposes. It relied on natural uranium as a nuclear fuel for its operation, graphite as a moderator, and air to cool the reactor core.[8]

The accident occurred in reactor No. 1 as a result of a broken down control device during the course of a routine operation of the installation. Consequently, the fuel elements melted, releasing large amounts of radioactivity and infecting a number of people and the environment in the vicinity of the plant. The two other reactors operating in the plant were also shut down.

The British authorities examined 238 people living in the vicinity of the plant. 126 of them were affected by radioactivity, but nobody was seriously injured.[9] In addition, the milk production within 200 square miles of the plant was declared unfit for consumption for a period of time. The milk production was contaminated by the radioactive iodine released by the accident.[10] As a result, a considerable number of farmers were affected by the accident. Furthermore, the damage caused to the plant itself amounted in total to two million pounds sterling.[11] The accident also had a harmful transboundary environmental impact on a number of neighbouring countries, viz. Belgium, the Netherlands, Denmark, France, Norway, Sweden, etc.[12] However, no State claimed compensation for the damage.

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[8] Stephen Tromans and James FitzGerald, "The Law of Nuclear Installations and Radioactive Substances", First Edition, Sweet & Maxwell, London, 1997, at p. 29.

[9] The Egypt Nuclear Power Plants Authority (ENPPA), "Nuclear Energy: Safety and Hope", Egyptian Ministry of Electricity and Energy, Egypt, Arabic Edition, 1986, at p. 31.

[10] Jerry L. Weinstein (ed.), "Law and Administration, Nuclear Liability", Vol. 3, Pergamon Press, Oxford, London, New York, Paris, 1962, foreword, at p. vii.

[11] M.J.L. Hardy, "International Protection Against Nuclear Risks", in: ICLQ, Vol. 10, 1961, pp. 789-759, at p. 742.

[12] PAN American Union, "Third Party Liability in the Field of Nuclear Energy", a study prepared in accordance with Resolution VIII of the Second Meeting and Resolution IX

2.3.2 The Chalk River accident

This accident occurred in an experimental reactor in Canada in May 1958, as a result of the breakdown of one of the nuclear fuel rods inside the reactor in the apparatus carrying the nuclear fuel, when spent fuel elements were being removed.[13] The defective fuel rod was found burning after being removed from the test reactor. Consequently, the reactor was shut down for a time to be decontaminated, and for the installation and other facilities to be cleaned up. Nobody was seriously exposed to radioactivity.[14] The accident contaminated the interior of the reactor, and released limited amounts of radioactivity in the vicinity of the installation.[15] However, nobody claimed compensation for this damage.

2.3.3 The Cosmos 954 accident

A number of nuclear accidents occurred in objects in space operated by nuclear reactors or nuclear energy, such as Cosmos 1402 in 1983 and Cosmos 1960 in 1988.[16] However, the most serious accident which has occurred in outer space up to now was the Cosmos 954 accident. This accident occurred on 24 January 1978 in the ex-USSR satellite Cosmos 954, which was carrying 50 kg of isotope of enriched uranium 235 in the reactor operating the satellite. The satellite broke up, and caused radioactive contamination over 50,000 kilometres of the northern territory of Canada.[17] Consequently, '[t]he deposit of hazardous radioactive debris from the satellite throughout a large area of Canadian territory, and the presence of that debris in the environment rendering part of Canada's territory unfit for use, constituted "damage to property" …'[18]

2.3.4 The Three Mile Island accident

The Three Mile Island (TMI) accident occurred in reactor No. 2 at the Three Mile Island nuclear power station in Pennsylvania in the United States, at 4

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of the Third Meeting of the Inter-American Nuclear Energy Commission, Washington, D.C., 1962, at p. 46.

[13] ENPPA, 1986, at p. 31.

[14] Pan American Union, 1962, at p. 46.

[15] ENPPA, 1986, at p. 31.

[16] R. I. R. Abeyratne, "The Use of Nuclear Power Sources in Outer Space and Its Effect on Environmental Protection", in: JSL, Vol. 25, No. 1, 1997, pp. 17-28, at p. 17.

[17] Jan Willisch, "State Responsibility for Technological Damage in International Law", Duncker & Humblot/Berlin, 1987, at p. 9.

[18] Ian Brownlie, "System of the Law of Nations: State Responsibility", Part I, Clarendon Press. Oxford, 1983, Appendix II, pp. 277-283, at p. 280.

a.m. on 28 March 1979.[19] The total capacity of the plant at that time was 960 Mwe.[20] The accident happened as a result of the failure of the feed water pumps to supply the reactor. This failure led to the turbine automatically shutting down, causing an increase in temperature and pressure in the primary cooling water of the reactor.[21] The water and steam escaped from the pressure valve when the relief valve failed to close, allowing thousands of gallons of cooling water to escape from the reactor.[22] This continued until the level of water supplying the reactor reached the normal water pressure. The operators did not realize this until the core of the reactor lost cooling water and the heat increased to the point where damage was caused.[23]

The reactor core was very badly damaged, and some of the fuel melted due to a shortage of the cooling water that cools down the reactor core. There was also extensive contamination of the primary coolant circuit. The interior of the reactor was contaminated, and some radioactivity was released through the ventilation stack before the contaminated building was effectively isolated. However, nobody on the site of the installation was badly injured, although the accident caused heavy damage to the population living close to the plant. Two million people living in 80 square kilometres around the plant were slightly affected by radioactivity.[24] Immediately after the accident, the Governor of Pennsylvania announced that there had been an accident, and evacuated 11,000 people from a radius of 15 miles of the accident area to another site five miles away.[25]

The accident was 'attributed largely to errors by operating personnel in failing to diagnose what was happening and consequently taking a number of actions which made matters worse. Some of these diagnostic mistakes were due to design weakness in instrumentation systems. Other errors were due to

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[19] The Three Mile Island Nuclear Power Plant comprises two pressurized water reactors. The Plant is located in Dauphin Country, Pennsylvania, approximately 15 miles downstream from the State capital in Harrisburg, on the Susquehanna River in Pennsylvania. It is owned by the General Public Utilities Corporation and operated by the Metropolitan Edison Company. William M. Hannay, "Adjudication of Claims Following a Nuclear Accident", in: Cameron, Hancher and Kühn (eds.), 1988, pp. 151-158, at p. 151. For the accident see, Rasmussen, 1994, at pp. 33-38.

[20] NEA, 1993, "Achieving Nuclear Safety: Improvements in Reactor Safety Design and Operation", OECD, Paris, 1993, at p. 29.

[21] Tromans and FitzGerald, 1997, at p. 29.

[22] NEA, Achieving Nuclear Safety, 1993, at p. 36.

[23] William M. Hannay, "Adjudication of Claims Following a Nuclear Accident", in: Cameron, Hancher and Kühn (eds.), 1988, pp. 151-158, at pp. 151-152.

[24] ENPPA, 1986, at p. 33.

[25] Tromans and FitzGerald, 1997, at p. 30.

inadequacies, or [the] non-existence, of procedures to deal with the developing accident situation'.[26]

2.3.5 The Chernobyl accident

The Chernobyl nuclear accident occurred at the Chernobyl nuclear power plant in Chernobyl in the Ukraine, a state of the former USSR, at 1:23 a.m. local time, on Saturday, 26 April 1986. The accident happened in reactor No. 4 during a turbine test. The USSR authorities did not immediately make notification of the accident. However, on 28 April 1986, an abnormally high degree of radioactivity was recorded in the surrounding countries, and this was announced by the Swedish and Finnish authorities. The USSR authorities announced that there had been an accident in a televised statement at 9.00 a.m. three days later, stating that: 'An accident has taken place at the Chernobyl Power Station, and one of the reactors was damaged. Measures are being taken to eliminate the consequences of the accident. Those affected by it are being given assistance. A government commission has been set up'.[27] Four months later, the USSR authorities sent a detailed report to the IAEA about the relevant facts of the accident.[28]

Furthermore, as mentioned above, because of the delay in the notification of the accident by the USSR authorities, the international community immediately mobilized itself and adopted, under the auspices of the IAEA, the "Convention on Early Notification of a Nuclear Accident" and the "Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency", which were adopted on 26 September 1986 in a special conference held in the IAEA Headquarters from 24-26 September 1986.[29] The USSR authorities were very slow to take measures to protect the victims and the environment and to repair damage caused by the accident. These measures were taken by the USSR authorities only after public protests in 1989.[30] As a result of these protests:

> 'At the end of 1989, the governments of the three republics [most affected by the accident] adopted special programs to cope with the aftermath of the Cher-

[26] NEA, Achieving Nuclear Safety, 1993, at p. 29.
[27] Dusko Doder and Louise Branson, "Gorbachev: Heretic in Kremlin", Futura Publications, London, United States, 1990, pp. 129-141, at p. 132.
[28] Doder and Branson, 1990, at p. 133.
[29] IAEA, "Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency", IAEA Legal Series No. 14, IAEA, Vienna, 1987.
[30] Oleg S. Kolbasove, "Ecological Disaster Area: The Chernobyl Case Study", in: BCEALR, Vol. 19, Issue 3, 1991-1992, pp. 637-640, at p. 638.

> nobyl accident. Parliamentary hearings on the accident took place at the republican and federal levels during the spring of 1990. On April 25, 1990, the Supreme Soviet of the U.S.S.R. adopted a special decree establishing a unified program of urgent social aid measures for victims. It allocated fourteen billion roubles for this program from the federal budget. In addition, both the federal government and the three republics created special administrative bodies and state committees to ameliorate the consequences of the accident.
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> The parliaments of the three republics, as well as the federal government, adopted special laws providing aid for Chernobyl accident victims and creating a legal regime for managing the radioactively polluted territories. The federal law, passed May 12, 1991, that enacted these provisions is entitled "On the Special Protection of the Individuals Who Are Victims of the Chernobyl Accident'.[31]

The Chernobyl accident was the worst accident in the history of the use of nuclear reactors. The radioactivity caused by the accident surpassed 50 million Curie, which is equal to the levels that would result from the simultaneous explosion of 500 atomic bombs.[32] The accident had harmful consequences inside and outside the USSR. The reactor concerned and the fuel used to operate the reactor were completely destroyed. The reactor was entirely new, and had only been in operation for three years. It was not insured, because it was owned and operated by the State. Therefore the value of the reactor was not covered by any insurance.[33] In addition, the 350,000 people living in the accident area were evacuated as far as one hundred miles away from the area,[34] 31 people died immediately after the accident, and about 140 people suffered various degrees of radiation sickness and poor health. The accident also had long-term harmful consequences. Tens of thousands of people are expected to develop diseases such as thyroid cancer [35] and people who were directly exposed to the accident suffered psychological effects.[36] Moreover, the accident badly affected the economy, property and the envi-

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[31] Kolbasove, BCEALR, Vol. 19, Issue 3, 1991-1992, at p. 638.

[32] Xue Hanqin, "Transboundary Damage in International Law", Cambridge University Press, UK, New York, Madrid, Cape Town, Melbourne, 2003, at p. 22.

[33] Dow, 1989, at p. 415.

[34] Hanqin, 2003, at p. 22.

[35] It was stated that as a result of the accident, 120,000 people in Czechoslovakia, 86,000 in Hungary, and 50,000 in Germany are excepted to suffer from cancer in the future.

[36] NEA, Chernobyl Ten Years, 1996, 1996, at pp. 12 and 59; Anthony Browne, "Myth of Chernobyl Suffering Exposed", the Observer, Sunday 6 January 2002, at p. 20 available at: http://www.guardian.co.uk/world/2002/jan/06/socialsciences.highereducation (accessed on 24.2.2012).

ronment of many States, particularly agricultural production.[37] Radioactivity caused by the accident contaminated the agricultural crops and animal products of many States.[38] It spread throughout the northern hemisphere and affected more than one hundred thousand people across Europe.[39] For example, Italy prohibited the sale of green vegetables, resulting in losses for farmers of approximately one hundred million dollars.[40] In Sweden 100,000 reindeer became unfit for human consumption, and in Germany the accident caused the loss and damage of many agricultural fields. Other damage caused by the accident was described as follows:

> 'The widespread radioactive contamination of the air, water and soil entailed direct damage to spring vegetables, milk-producing cattle had to be kept from grazing, the consumption of milk and other foodstuffs had to be supervised, import restrictions became necessary, the fixing of state intervention levels led to a change in consumers' eating and buying habits, travel agencies and transport undertakings specialised in Eastern Europe business lost their clientele, and finally, seasonal workers in agriculture lost their jobs'.[41]

The rescue operation also cost approximately $2.7 billion.[42] As a consequence of the damage and loss, prices rose in many countries and the overall economic performance of these countries declined significantly.

Moreover, at the end of 1995, the G7 countries and Ukraine signed a Memorandum of Understanding to establish a comprehensive programme for decommissioning the remaining parts of the Chernobyl nuclear power plant by the year 2000. The G7 countries provided $500 million as grant assistance, and another $1.8 billion in anticipated investments which were provided by the international financial institutions.[43]

The Chernobyl accident has clearly shown that a major nuclear accident can cause an enormous amount of damage, not only in the Installation State,

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[37] NEA Secretariat, NLB, No. 39, 1987, pp. 58-65. For assessment of the harmful consequences of the accident see, IAEA International Advisory Committee, "The International Chernobyl Project: An overview, Assessment of Radiological Consequences and Evaluation of Protective Measures", IAEA, Vienna 1991.

[38] NEA, Chernobyl Ten Years, 1996, at p. 73.

[39] Doder and Branson, 1990, at p. 135.

[40] Sands, 1988, at p. 2; Barron, CJTL, Vol. 25, No 3, 1987, at pp. 647-648.

[41] F. R. of Germany, Third Party Liability: Compensation for Damage Caused by the Chernobyl Accident under the Atomic Energy Act (1986), NLB, No. 38, 1986, at p. 21.

[42] See, The Politburo's report on the Chernobyl crisis, Pravda, July 20, 1986, referred to in Doder and Branson, 1990, at p. 136.

[43] Tromans and FitzGerland, 1997, at p. 33.

but also outside the borders of that State.[44] It showed that the range of nuclear damage suffered as a result of a major nuclear accident seems almost limitless. Despite the fact that there are no precise figures available on the damage caused by the Chernobyl accident, the costs of the accident over the last two decades may have surpassed hundreds of billions of dollars.[45] These figures are expected to increase further, particularly with regard to the cost of measures to restore the environment to its previous condition in the regions affected by the accident, which may take a very long time. This is because '[n]o one knew the real scale of [the] environmental catastrophe [... in Chernobyl and thus] it will take […] one hundred years or more to restore the quality of the environment and liv[e]able conditions in these regions'.[46]

Nevertheless, as mentioned above, the USSR attributed the cause of the accident to a violation of the regulations by the operating personnel, and rejected any legal liability for the consequences of the accident under international law, only admitting moral accountability.[47]

2.3.6 The Tokaimura accident

The Tokaimura accident occurred in a uranium processing plant in Tokaimura, Japan, at 10.35 a.m. local time, on 30 September 1999, when three workers were mixing a liquid batch of uranium at a plant operated by JCO Company Ltd., a private company.[48] The accident is considered the third worst nuclear accident after Chernobyl and Three Mile Island, and one of the major nuclear accidents in the history of Japan.[49]

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[44] Vanda Lamm, "The Protocol Amending the Vienna Convention", in: NLB, Vol. 61, 1998, pp. 7-24, at pp. 7-8; Vanda Lamm, "The Protocol Amending the Vienna Convention", in: NEA, International Nuclear Law, 2006, pp. 169-185, at p 170.

[45] Julia A. Schwartz, "International Nuclear Third Party Liability Law: The Response to Chernobyl", in: NEA, International Nuclear Law, 2006, pp. 37-72, at p. 38.

[46] Kolbasove, BCEALR, Vol. 19, Issue 3, 1991-92, at p. 638.

[47] Charles Rousseau, chronique des faits internationaux, in: RGDDIP, Vol. 91, 1987, pp. 83-156, at p. 86; Koen Lenaerts, "Border Installations", in: Cameron, Hancher and Kühn (eds.), 1988, pp. 49-82, at p. 82.

[48] Siegfried Joussineau; Louis Riddez (ed.), KAMEDO Report No. 78, Nuclear Accident in Japan,1999, published on 23 March 2006, at p. 117, available at: http://pdm.medicine.wisc.edu/Volume_21/issue_2/kamedo_78.pdf (accessed on 28.8.2010). Three workers at the plant were mixing 35 pounds of uranium with nitric acid, greatly exceeding the 4.8 pound safety limit. Suddenly there was a flash of blue light, the ominous flash of radiation at the moment when the uranium begins a chain reaction.

[49] Megan Brynhildsen, "Problem in the Nuclear Age: The 1999 Nuclear Accident in Japan", in: CJIELP, 1999 Yearbook, 2000, pp. 241-252, at pp. 241-242.

Immediately after the accident, the three workers involved in the preparation of the nuclear material were hospitalized.[50] Other people were exposed to radioactivity, including 145 JCO employees, 60 government officials and 207 local residents.[51] Radiation emitted by the plant was ten thousand times over the normal limit permitted during the course of the normal operation of the plant.[52] The level of radiation emitted by the accident reached the levels which occur in an accident in a nuclear power plant.

In addition, a number of people living in the area surrounding the plant were evacuated and suffered from the effects of the accident. According to the Interim Report of 5 November 1999 of the Investigation Committee for the Critical Accident at the Uranium Processing Plant, which was established by the Nuclear Safety Commission on 7 October 1999 to investigate the accident, the immediate consequences of the accident included:

> The 'evacuation of approximately 50 households within 350 metres and the recommendation to remain indoors for approximately 300 000 people living within a 10 km radius, transportation facilities were cancelled and schools and other public facilities were temporarily closed, as were private companies. The effects of the accident were very large, both socially and economically. Residents living near the site were not only inconvenienced [… by] the evacuation and the recommendation to stay indoors, but they […] were [also] subjected to the mental and physical [… suffering] caused by rumours. At the same time, […] measures [… such as] psychological counselling are necessary. Following the accident, there [… were] many adverse effects [… because] rumours [… lead to] misunderstanding'.[53]

The investigation after the accident revealed that the three workers working with the nuclear substances did not have any government training or a licence to work with nuclear material.[54] It was also reported that the operator of the plant was liable for nuclear damage caused by the accident due to his failure to take the necessary safety measures to prevent the accident.[55] The

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[50] Brynhildsen, CJIELP, 1999 Yearbook, 2000, at pp. 241-242. Two of the workers subsequently died on 21 December 1999 and 27 April 2000 respectively. NLB, No. 66, 2000, p. 13.

[51] OECD/NEA Secretariat, "Tokai-Mura Accident, Japan: Third Party Liability and Compensation Aspects", in: NLB, No. 66, 2000, pp. 13-21, at p. 13.

[52] Charles Arthur, "Progress First, But Safety Last", in: The Independent on Sunday, 3 October 1999, at p. 20.

[53] NEA, Secretariat, NLB, No. 66, 2000, p. 14.

[54] Brynhildsen, CJIELP, 1999 Yearbook, 2000, at p. 243.

[55] JCO Co. (JCO), the private company that operated the plant in Tokaimura, deviated from government-approved procedures by drafting its own manual for the operation at the plant. The factory had in place a government-approved system which allowed the

accident revealed that a number of nuclear facilities operating in Japan were in violation of the health and safety measures, and nuclear law. Consequently, the Japanese Ministry of Labour issued instructions to improve records and safety measures. The Law for the Regulation of Nuclear Source Material, Nuclear Fuel and Reactors was amended on 13 December 1999 and entered into force on 1 July 2000, to improve nuclear safety regulations. Finally, a new Special Law on Emergency Preparedness for Nuclear Disaster was adopted on 17 December and entered into force on 16 June 2000, to amend and complement the Basic Law for Countermeasures against Disaster.[56]

2.3.7 The Fukushima Nuclear Accident

The Fukushima nuclear accident occurred as a result of the explosion of the Fukushima Daiichi nuclear power plant that had been damaged by an earthquake (magnitude 9.0) and a tsunami, in Japan on 11 March 2011.[57] This was the second serious nuclear accident that occurred in the nuclear industry in Japan, after the 1999 Tokaimora nuclear accident and the third major nuclear accident in the history of nuclear reactors used for peaceful ends, after the 1979 Three Mile Island and the 1986 Chernobyl accidents.[58] Reactor buildings were damaged by explosions caused as a result of the damage sustained in the massive earthquake and tsunami.

The Fukushima Daiichi nuclear power plant consists of 6 reactors, four of which were damaged by the earthquake and tsunami. The damaged reactors included: reactor number 1, in which an explosion destroyed the reactor building on 12 March; reactor 2, in which an explosion caused a radiation leak on 15 March; reactor 3, in which an explosion destroyed the reactor building, and the spent fuel pools of units 1 and 3, causing radiation to leak

uranium to be prepared slowly, using three different tanks connected by pipes with attached metering devices. Brynhildsen, CJIELP, 1999 Yearbook, 2000, at p. 243.

[56] Yoshio Baba, "The Problems Facing Nuclear Power in Japan: Emphasizing Law and Regulations", in: NLB, No. 69, 2002, pp. 16-28, at p. 18.

[57] J. Nakoski and T. Lazo, "Fukushima", in: NEA News, Vol. 29, No. 1, 2011, pp. 6-10, at p. 6, available at: http://www.oecd-nea.org/nea-news/2011/29-1/29-1-inte.pdf#page=5 (accessed on 29.9.2011); Background about the Fukushima accident see, The Legal Affairs Section of the OECD Nuclear Energy Agency, "Regulatory and International Framework in Japan Against the Background of Fukushima", in: NLB, No. 87, 2011, pp. 27-44, at pp. 27-29.

[58] Selma Kuş, "International Nuclear in the 25 Years Between Chernobyl and Fukushima and Beyond...", in: NLB, No. 87, 2011, pp. 7-26, at p. 7.

into the atmosphere on 14 March; reactor 4, in which an explosion caused extensive damage to the reactor building on 15-16 March.[59]

As a result of these explosions and the damage to the power supplies caused by the tsunami, the cooling system of the reactors failed to supply the reactors with the cooling water needed to slow down the nuclear reaction process and reduce the heat inside the reactors. Consequently, the water stopped circulating and began to boil, creating steam. The fuel rods got hotter and reacted with the steam, creating hydrogen gas. The technicians attempted to release the gas and steam from the pressurised vessel to reduce the pressure inside the reactor. However, the gas exploded and damaged the reactor buildings. In addition, there were two major fires in reactor 4 caused by low water in storage pools designed to cool spent nuclear fuel. The officials flooded the reactor with seawater as an emergency coolant to cool down the reactor, and used boric acid to reduce the nuclear reaction process inside the reactors. On 17 March, helicopters dropped seawater onto reactors 3 and 4 to fill the storage pools containing spent fuel rods with water. To bring the situation under control, power had to be restored to the plant's damaged cooling system so that the pumps could be used again to pump cooled water into the storage pools and bring the nuclear fuel back to safer temperatures, stabilizing the situation in order to prevent any further explosions.[60]

In addition to the damage caused to the reactors, the accident also caused considerable damage to the surrounding population and the environment.[61] The Japanese authorities evacuated the population living in the vicinity of the plant immediately on the same day of the accident to an area 3 km from the plant, for their protection. However, on the following day, when the situation worsened, they were evacuated once more to another area 20 km further away.[62] An estimated 115,000 people were evacuated from the area around the plant, 15,000 were confirmed dead and many others were injured and affected by radioactivity.[63] Of course, these figures include the victims of the earthquake and the tsunami. The environment was also severely af-

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[59] Nakoski and Lazo, NEA News, Vol. 29, No. 1, 2011, at pp. 6-7.

[60] Japan "unprepared" for Fukushima nuclear disaster, http://www.bbc.co.uk/news/world-asia-pacific-13678627 (accessed on 7.6.2011); Greenpeace International, Nuclear Crisis in Fukushima Japan at: http://www.greenpeace.org/international/en/campaigns/nuclear/safety/accidents/Fukushima-nuclear-disaster/ (accessed on 27.9.2011).

[61] Nakoski and Lazo, NEA News, Vol. 29, No. 1, 2011, pp. 6-10, at p. 9.

[62] Nakoski and Lazo, NEA News, Vol. 29, No. 1, 2011, pp. 6-10, at p. 6.

[63] Japan crisis: Tepco agrees conditions for State aid, available at: http://www.bbc.co.uk/news/world-asia-pacific-13360758 (accessed on 11.5.2011).

fected by the radioactivity caused by the accident. Platinum was discovered in the soil around the area surrounding the plant and in seawater, and there were high levels of radioactivity due to melting nuclear rods and interaction with the water. There were also economic losses resulting from prohibitions of foodstuffs, the temporary closure of businesses and electricity problems.

2.4 Types of nuclear accidents

Although there are different classifications of nuclear accidents in the science of nuclear technology, they can be divided into two main categories as regards the application of the provisions of the nuclear liability conventions: the first category includes major and minor accidents; and the second includes internal, external and transboundary nuclear accidents. The first category of nuclear accidents corresponds with the technical definition of a nuclear accident, while the second is identical to the geographical scope approach. This classification is recognized under the IAEA International Event Scale. It also corresponds with the classification of the doctrine of nuclear liability law. The Scale classifies nuclear accidents into three main categories, major accidents, minor incidents and non-nuclear incidents. A brief summary of the classification of nuclear accidents according to the geographical scope of application of the nuclear liability conventions, i.e., internal, external, and transboundary accidents, has proved to be useful for this study.[64]

2.4.1 Internal accidents

Internal accidents include minor accidents which occur inside a nuclear reactor and gradual releases of radioactivity during the course of the normal operation of a nuclear installation, where the harmful consequences of a nuclear accident are limited inside the installation itself. Usually this type of nuclear accident occurs during the normal course of operation of a nuclear installation. The harmful consequences of such nuclear accidents are limited to the installation itself, workers in the installation and the environment inside the installation. In this respect, a large number of nuclear accidents occur during the routine operation of a nuclear installation. Damage caused by such accidents is not covered by the nuclear liability conventions. It is covered under the ordinary law of the Installation State, if the law provides for this. The authors of the nuclear liability conventions exempt the operator from liability for nuclear damage caused by nuclear accidents to the nuclear

[64] Zaki Zaki El Shaaraoui, "Lectures in Nuclear Law", Arabic Edition, Cairo 1992, at p. 28.

installation itself during construction, on the site of the installation, or on any property located on the site of the installation or to be used in connection with the installation.[65]

2.4.2 External accidents

An "external accident" means any accident occurring in a nuclear installation and its harmful consequences outside the installation or during the transport of nuclear substances within the territory of a State, but without the damage spreading beyond the boundary of the State. The harmful consequences of such types of accidents could include grave effects on people, property and the environment. Numerous nuclear accidents of this type have occurred since the initial use of nuclear reactors. As mentioned earlier, the most serious accidents which have occurred in land-based nuclear reactors were the 1957 Windscale accident in Britain,[66] the 1958 Chalk River accident in Canada,[67] the 1979 Harrisburg accident in the Three Mile Island in Pennsylvania, USA,[68] the 1999 Tokaimura nuclear accident in Japan[69] and the 2011 Fukushima nuclear accident in Japan. The harmful consequences of these accidents were very serious and caused nuclear damage to many people and the environment in areas surrounding the installations. They also led to the dumping of agricultural and industrial products in these areas.[70] Damage caused by external accidents is usually covered under the nuclear liability conventions.

2.4.3 Transboundary accidents

Transboundary nuclear accidents include any accident occurring in a nuclear installation, or to nuclear substances transported to or from the installation, causing harmful consequences not only on or around the site of the nuclear installation, but also beyond the borders of the State. The harmful consequences of transboundary nuclear accidents caused by nuclear facilities are

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[65] Article 3 (a) of the Paris Convention.

[66] Weinstein (ed.), 1962, foreword, at p. vii; Tromans and FitzGerald, 1997, at p. 29; ENPPA, 1986, at p. 31; PAN American Union, 1962, at p. 46.

[67] PAN American Union, 1962, at p. 46; ENPPA, 1986, at p. 31.

[68] Hannay, 1988, at p. 151; NEA, Achieving Nuclear Safety, 1993, at p. 29; Tromans and FitzGerald, 1997, at pp. 29-30; ENPPA, 1986, at p. 33; John L. Quattrocchi, "Nuclear Liability Insurance in the United States: An Insurer's Perspective", OECD/NEA and IAEA, 2000, pp. 383-398, at p. 390.

[69] Brynhildsen, CJIELP, 1999 Yearbook, 2000, pp. 241-252; Arthur, Independent, 1999, at p. 20.

[70] ENPPA, 1986, at p. 31.

serious, and spread from the country in whose territory the accident occurred to other States, or to the global commons, causing nuclear damage to persons, property and the environment.

In general, transboundary damage is defined as the 'harm caused by activities carried out in places under the jurisdiction or control of one State and arising in places under the jurisdiction or control of another state or in places outside national jurisdiction (the global commons)'.[71] It also 'means damage caused to persons, property or the environment in the territory or in other places under the jurisdiction or control of a State other than the State of origin'.[72] Thus the notion of a nuclear accident is closely interrelated with the notion of nuclear damage, as damage is a natural consequence of any accident. However, there is no definition of an environmental accident.[73]

This type of accident might occur in nuclear-powered ships as they sail from one place to another, or in ships transporting nuclear materials, or in objects in space, or in a land-based reactor installation in the case of major accidents. A few nuclear accidents have caused harmful transboundary consequences, i.e., the Cosmos 954 accident in 1978[74], and the accident in Chernobyl in 1986.[75]

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[71] Allan Rosas, "Issues of State Liability for Transboundary Environmental Damage", in: NJIL, Vol. 60, Issue 1/2, 1991, pp. 29-47, at p. 29. Article 2 (g) of the ILC Draft Articles on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, in the sixth report on international liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Mr. Julio Barboza, Special Rapporteur, U.N. Doc. A/CN.4/428 and Add.1, (1990), reprinted in YILC, 1990, Vol. II, Part One, U.N. Doc. A/CN.4/SER.A/1990/Add.1 (Part 1), at p. 83 and the Draft Articles, at p. 105.

[72] Article 2 (e) of the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities.

[73] As Timoshenko observed: 'The term "environmental damage" may be used [... for] cover any damage that is caused to any person or property if it results from an incident [...] which is described as "environmental". This generally means an incident or occurrence which affects, or has [... a] potential to [e]ffect, [on] the environment. […] There is no agreed definition of the term "environmental incident" or [any] clear guide as to the factors which make an incident or occurrence properly described as "environmental". In general, the expression is used to refer to any incident which occurs as a result of, or in connection with, the production, transportation, handling or use of substances and wastes if the incident results in the release of substances or energy in such a way as to [...] adversely [affect] the quality or viability of a sector of the environment. Where such an incident causes damage to persons or property, the damage may be described as "environmental damage".' Thomas A. Mensah, "Scope of Definition of Environmental Damage", in: Timoshenko (ed.), 1998, pp. 61-62, at p. 61.

[74] Rip Bulkeley, "Nuclear Power in Space: A Technology Beyond Control?" in: Hans Günter Brauch (ed.), Military Technology, Armaments Dynamics and Disarmament:

As mentioned above, transboundary nuclear damage may be covered under the existing nuclear liability conventions, or under other international conventions, or the general rules of international law. For example, transboundary damage caused by nuclear ships is covered by the 1962 Brussels Nuclear Ships Convention. Damage caused during the transport of nuclear material and land-based installations may be covered by the 1971 Carriage of Nuclear Material Convention, the Amended Paris Convention, the Amended Vienna Convention and the 1997 Convention on Supplementary Convention. However, transboundary damage caused by objects in space is governed by the 1972 Outer Space Convention. Transboundary damage caused by a nuclear power station can be covered under the nuclear liability conventions or under the general rules of international law.

2.5 Conclusions

An examination of this chapter leads to the following conclusions. First, the terminology used in the nuclear liability conventions is misleading, and does not reflect the technical reality in practice, as adopted in the technical field and used in some of the legal literature. According to the technical definition adopted in the IAEA Scale to classify nuclear events, the term "incident" expresses a minor nuclear event, while the term "accident" expresses a major nuclear accident. Therefore under the nuclear liability conventions, the term "accident" is appropriate to describe major nuclear events, and the term "incident" to describe minor events. The two terms "incident" and "accident" should be inserted in the nuclear liability conventions. In that case, it would be difficult to find similar words which correspond to these two terms in other languages.

Secondly, major nuclear accidents caused by nuclear installations can cause considerable amounts of damage and not only have harmful consequences inside the nuclear installation, but also outside the installation. This is even worse if the accident causes transboundary environmental damage

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ABC Weapons, Military Use of Nuclear Energy and of Outer Space and Implications for International Law, M Macmillan Press Ltd London 1989, pp. 165-211, at p. 190; Abeyratne, JSL, Vol. 25, No.1, 1997, at p. 17; Marietta Benkö and Jürgen Gebhard, "The Use of Nuclear Power Sources in Outer Space", in: Marietta Benkö & Kai-Uwe Schrogl (eds.), International Space Law in the Making: Current Issues in the UN Committee on the Peaceful Uses of Outer Space, Forum for Air and Space Law, Vol. 1, Editions Frontiers, Yvette Cedex France 1993, pp. 19-110, at pp. 19-22.

[75] See, Chapter 7, "Chernobyl: The Honeymoon Ends", in: Doder and Branson, 1990, at p. 135; NEA, 1996, at p. 7; Sands, 1988, at p. 2; Barron, CJTL, 1987, Vol. 35, No. 3, 1987, at pp. 647-648.

beyond the borders of the State in whose territory the installation is located or under whose jurisdiction or control it has been operated.

Thirdly, the classification of nuclear accidents can be seen from two perspectives, the technical and geographical perspectives. From the first perspective, nuclear accidents could be classified as major and minor accidents, or sudden occurrence accidents and gradual emission accidents. However, from the second perspective, nuclear accidents might be classified into three types, i.e., internal, external and transboundary accidents. These classifications are based on the level of radioactivity resulting from a nuclear accident, which corresponds with the technical reality and with the provisions of the nuclear liability conventions. A nuclear event is classified as a minor or internal incident when the harmful consequences are limited to the installation. However, it is classified as a major or external incident when the accident causes serious environmental nuclear damage which spreads outside the installation. In addition, a nuclear accident is classified as a major or transboundary accident when its harmful consequences spread beyond the borders of the Accident State or the State under whose jurisdiction or control the installation was operated.

Finally, the significance of these classifications lies in the fact that under the nuclear liability conventions the operator of a nuclear installation is not liable for nuclear damage caused to non-Contracting States or transboundary damage by nuclear activities, in the case that the national legislation provides this. The conventions consider the operator liable for nuclear damage caused by a nuclear accident outside the site of the installation and liable for transboundary nuclear damage when the Installation State is a Contracting Party to the applicable nuclear liability convention. The conventions also exclude the operator from liability for minor nuclear damage caused by minor nuclear accidents resulting from minor nuclear activities.

3 REPARABLE ENVIRONMENTAL NUCLEAR DAMAGE: LEGAL BACKGROUND

3.1 Introduction

Reparable environmental damage is a complex problem and difficult to define under the nuclear liability conventions and other norms of international law, particularly when it concerns environmental damage caused by nuclear activities. This is because environmental damage can be produced or associated with other damage. It is difficult to separate environmental damage caused by nuclear activities from other related nuclear damage, personal and property damage, economic loss, etc. Moreover, the harmful consequences of environmental damage caused by a nuclear accident on human health may develop decades after the accident occurred. In addition, there is no separate definition under the nuclear liability instruments for environmental nuclear damage, as part of the definition of nuclear damage in general. Similarly, the provisions on nuclear liability under the nuclear liability conventions cover environmental and other nuclear damage.

> 'A legal definition of damage to the environment [therefore] is of fundamental importance, since such a definition will drive the process of determining the type and scope of the necessary remedial action – and thus the costs that are recoverable via civil [and international] liability. Legal definitions often clash with popularly held concepts of damage to the environment, yet are necessary for legal certainty'.[1]

The Chernobyl accident demonstrated that a major nuclear accident can cause serious physical and immaterial damage to people, loss or damage to property and environmental damage, as well as other related damage including the costs of preventive measures, cleaning up and the reinstatement of the environment to its *status quo ante*, and economic losses of profits for people as well as the State. This illustrated the importance of widening the concept of nuclear damage under the nuclear liability conventions to include broader provisions on the concept of reparable damage caused by a nuclear

[1] Commission of the European Communities, "Communication from the Commission to the Council and Parliament and the Economic and Social Committee: Green Paper on Remedying Environmental Damage", COM (93) 47 final, Brussels, 14 May 1993, at p. 10, available at: http://ec.europa.eu/green-papers/pdf/environmental_damage_gp_com_93_47.pdf (accessed on 24.4.2012).

accident.[2] It was considered that the concept of compensable nuclear damage should cover all environmental nuclear damage which is caused by and related to a nuclear accident to a sufficient degree. This implies covering not only direct damage caused by the accident, such as physical or material damage, but also indirect environmental nuclear damage such as profits and immaterial damage.[3]

This chapter examines the reparable environmental nuclear damage caused by nuclear accidents. It focuses mainly on the definition of the concept of recoverable damage caused to the environment by nuclear activities. The chapter answers certain questions necessary to determine the recoverable environmental nuclear damage. These questions are: What is the concept of environmental nuclear damage covered by international law? What is the type and extent of such damage? Is all environmental damage caused by a nuclear activity covered under international law, or are there certain conditions restricting the recovery of such damage? To answer these questions, the chapter examines the concept of nuclear damage and the conditions of the recoverable environmental damage under the nuclear liability conventions and the general rules of international law. The analyses focus first on defining the concept of terms related to damage, then the concept and scope of environmental nuclear damage covered under international law. Finally, it examines the conditions required to provide compensation for environmental nuclear damage. These issues are examined in relation to the relevant provisions of international law. However, as nuclear damage has been defined under the nuclear liability conventions, and there are also numerous international instruments dealing with the concept of environmental damage, these instruments will be a significant source in examining the issues of environmental nuclear damage.

The chapter is divided into 7 sections. Section 1 includes this introduction and Section 2 defines the terminology related to damage, harm, injury, etc. This is particularly important because the different conventions do not use a coherent and specified term for the concept of damage. Every convention has adopted different terms. Nevertheless, these conventions are the most relevant sources for the definition of recoverable nuclear damage and liability for such damage. Section 3 defines the concept of recoverable environmental nuclear damage, as developed in the nuclear liability conventions and

[2] For economic damage caused by the Chernobyl incident, NEA Secretariat, NLB, No. 39, 1987, pp. 58-65; Régis Mahieu, "The Impact of the New Nuclear Liability Regime on Nuclear Transport", in: Pelzer (ed.), 2010, pp. 87-92, at p. 90.

[3] Chul-Hoon Ham, Choong-Hie Yim and Sang-Won Kim, "The Third Party Liability System for Nuclear Damage in the Republic of Korea", in: International Nuclear Law Association, 1998, pp. 389-501, at p. 493; Jacobson, 1989, at pp. II-89 to II-100.

other norms of international law. Section 4 examines the scope of recoverable nuclear damage including environmental damage. It determines the extent of compensable environmental nuclear damage, and its relationship with other nuclear damage. This is important to determine the scope and extent of the liability for environmental nuclear damage. It also examines the concept of legal damage and its role in the liability for transboundary environmental consequences. It discusses whether or not damage caused by a State as a result of the violation of its international obligations constitutes an element in the liability for a wrongful act. Section 5 investigates the main conditions required for recoverable environmental nuclear damage. Section 6 describes the significance of environmental nuclear damage as the main element in the international liability mechanism.

3.2 Damage, harm and injury

The term damage is invariably used in the literature and international instruments to refer to different notions such as damage, harm, loss, pollution, contamination, impairment, harmful consequences, impacts etc. However, the most common terms used in this respect are the terms damage, loss, harm and injury. For example, the term "damage" is used in the nuclear liability conventions, and the terms "harm" and "injury" are used in the ILC Draft principles on the allocation of loss and the ILC Draft Articles on prevention of transboundary damage. The ILC Draft Articles on State Responsibility for wrongful acts do not use the term "injury", although the term "injured State" is used in Article 40 of these Articles, while the term "damage" is used in Articles 35, 42, 44 (1) and 45 (1).[4] Furthermore, the terms "loss", "injury"[5] and "harm" are sometimes used interchangeably in the ILC reports.[6] Damage covers the term "loss" and "impairment" in the nuclear liability conventions. The term "loss" is used in these conventions in relation to personal and property damage, and the term "impairment" in relation to damage caused to the environment. The terms "pollution" and "contamination" are also used in

[4] J. Crawford, Special Rapporteur, First Report on State Responsibility, International Law Commission, Fiftieth session, Geneva, 20 April-12 June 1998, New York, 27 July-14 August 1998, UN Doc. A/CN.4/490/Add.4 (1998) at p. 4, para. 105.

[5] YILC, 1982, Vol. II, Part One, Third Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Mr. Robert Q. Quentin-Baxter, Special Rapporteur, A/CN.4/360, at p. 58, paras. 34-35.

[6] YILC, 1980, Vol. II, Part One, Preliminary Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Mr. Robert Q. Quentin-Baxter, Special Rapporteur, A/CN.4/334, Add. 1 and 2, at pp. 256-258, paras. 32-39.

a general way in the sense of environmental damage, as the term "pollution" is used often interchangeably with the phrase "damage caused to the environment".[7] It was argued that:

> 'The terms "injury", "harm", "damage", "loss", etc. are not defined consistently in international law and there are no agreed or exact equivalencies between them in the various official languages of the United Nations. A review of any given field will reveal a range of terms and definitions specific to the context – for example, in the various treaties dealing with transboundary pollution. Given the current state of international law, it would be wrong to presume any specific definition of "injury" or "damage" applicable across the board. The many declarations and agreements which lay down primary rules of responsibility do not seem to be in derogation from any general rule about injury or damage, nor do they embody so many special provisions given effect by way of the *lex specialis* principle. Rather each is tailored to meet the particular requirements of the context and the balance of a given negotiated text. Thus the most that the articles can do is to use general terms in a broad and flexible way, while maintaining internal consistency'.[8]

There are subtle distinctions between the three terms. It has been argued that the term "damage" is a financial concept, and the term "harm" is a physical concept, while the term "injury" or "loss" is a legal concept.[9] Nevertheless, physical damage or physical harm can be expressed as physical injury.[10]

Some authors consider that the term "damage" includes material or moral detriment suffered by a State. Material damage is expressed in terms of money or indemnities and also includes moral damage which requires financial compensation. The latter refers to injury caused to a State such as a loss of honour or dignity or damage to its political interests.[11] According to Brownlie, damage also means loss, whether this involves a financial quanti-

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[7] Marie-Louise Larsson, "Legal Definitions of the Environment and of Environmental Damage", in: Scandinavian Studies in Law, Vol. 38, 1999, pp. 155-176, at p. 158, available at: http://www.scandinavianlaw.se/pdf/38-7.pdf (accessed on 20.9.2011).

[8] James Crawford, Jacqueline Peel and Simon Olleson, "The ILC's Articles on Responsibility of States for Internationally Wrongful Acts: Completion of the Second Reading", in: EJIL, Vol. 12, No. 5, 2001, pp. 963-991, at p. 971.

[9] Lefeber, 1996, at p. 16.

[10] Bruce A. Hurwitz, "State Liability for Outer Space Activities in Accordance with the 1972 Convention on International Liability for Damage Caused by Space Objects", Martinus Nijhoff Publishers, Dordrecht/Boston/London, 1992, at p. 13.

[11] Handl, AJIL, Vol. 69, No. 1, 1975, pp. 50-76, at p. 51.

fication of physical injury or damage, or other consequences resulting from a breach of an obligation.[12]

Other authors consider that the term "injury" is 'the legal wrong done to another arising from a breach of an obligation, as "consisting" of damage. In some cases damage may be the gist of injury, in others not; in still others there may be loss without any legal wrong (*damnum sine injuria*)'.[13] According to Article 31 of the Draft Articles on State Responsibility, injury covers any damage, whether material or moral, arising from an internationally wrongful act of a State.[14] Nevertheless, some lawyers in the ILC considered that 'the word "injury" should be reserved for a breach of a legal obligation which might, but need not necessarily, entail material damage. In the context of liability, it would be better to speak of "harm" or "loss" rather than "injury", to make it clear that the reference was to material damage and also to avoid any confusion with injury caused by wrongful acts'.[15] According to the Special Rapporteur Crawford, the terms "injury" and "damage" are distinct, as the concept of "injury" in the term "injured State" involves the concept of a "legal injury", while the term "damage" refers to material or other loss suffered by the injured State.[16] Similarly the Special Rapporteur Riphagen argues that, '…injury and damage are not identical terms. Injury means an infringement of a right, and does not necessarily create a damage in the ordinary sense of the word'.[17] However, Handl refers to the Trail Smelter arbitration, and states that:

> 'Some confusion surrounds the tribunal's use of the terms "injury" or "damage" ("damage" being the term the parties preferred to "injury") and "damages" in the sense of indemnities. […T]o be sure [that] "injury" [has been suffered, it] must be established by clear and convincing evidence, [but] no further substantive qualifications can be inferred with certainty from this deci-

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[12] Brownlie, 1983, reprinted 1986, at p. 199; Ian Brownlie, "Principles of Public International Law", Seventh Edition, Oxford University Press, New York, 2008, at p. 459.

[13] Crawford, Peel and Olleson, EJIL, Vol. 12, No. 5, 2001, at p. 972.

[14] Article 31 (2) of the Draft Articles on Responsibility of States for Internationally Wrongful Acts adopted by the International Law Commission at its fifty-third session (2001) *Official Records of the General Assembly, Fifty-sixth session, Supplement No. 10* (A/56/10), chp. IV.E.1).

[15] YILC, 1987, Vol. I, at p. 146, para. 39.

[16] J. Crawford, Special Rapporteur, First Report on State Responsibility, International Law Commission, Fiftieth session, Geneva, 20 April-12 June 1998, New York, 27 July-14 August 1998, UN Doc. A/CN.4/490/Add.4 (1998), at p. 3, para. 105.

[17] William Riphagen, Special Rapporteur, Third Report on the Content, Forms and Degrees of State Responsibility, UN Doc. A/CN.4/354/Add.1, 12 March 1982, ap. 26, footnote 60.

> sion. Thus the essential question of whether "injury" means material damage or [also] includes moral damage […] has not been dealt with conclusively'.[18]

In conclusion, these arguments suggest that the term "damage" applies to the State liability for lawful activities, and the term "injury" to State responsibility for unlawful acts. However, in practice, the terms are sometimes used interchangeably for the liability of a State for both lawful and unlawful activities. For example, material damage caused by a nuclear accident can also cause moral or psychological damage, which can be assessed in terms of indemnities. Thus it could be argued that the term "damage" can be used as a synonym of other terms, such as harm, injury, etc. However, the term "damages" means compensation or indemnities. Perhaps this was the reason that the drafters of the nuclear liability conventions adopted the term "damage" to mean the harmful consequences caused by nuclear activities and compensation for that damage. These conventions govern liability and compensation for nuclear damage. According to the Preamble of the Paris Convention, the Contracting Parties are 'DESIROUS of ensuring adequate and equitable compensation for persons who suffer damage caused by nuclear incidents". Moreover, according to Webster's Dictionary, "damage" means 'injury or harm that impairs value or usefulness. […] However, [o]ften, damages […are used in the sense of] cost; expense; charge'.[19]

These synonyms do not have the effect of limiting or expanding the scope of liability, unless the terms are used to indicate a particular concept. This thesis adopts the term damage rather than the term impairment or any other term, although it sometimes refers to these terms. This is because the term damage is used most often in the nuclear liability conventions, and is also a commonly used term.[20]

3.3 Definition of the concept of nuclear damage

The definition of nuclear damage under the amended nuclear liability conventions was extended to cover not only personal and property damage, as was provided for under these conventions before the amendments, but also damage caused to the environment, economic loss, and the costs of preventive measures and measures for the restoration of the impaired environ-

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[18] Handl, AJIL, Vol. 69, No. 1, 1975, at p. 61.

[19] "Webster's Encyclopedic Unabridged Dictionary of the English Language", Gramercy Books, New York/Avenel, 1996, p. 365; see also, Harith Suleiman Faruqi, "Faruqi's Law Dictionary", English-Arabic, Librairie Du Liban, Riad Solh Square, Beirut, 1991, at p. 192.

[20] Graefrath, RDC, Vol. 185, Part II, 1984, at p. 19.

ment.[21] However, the conventions do not contain provisions and concrete criteria for determining the scope of this damage. In the absence of such criteria, the scope of recoverable nuclear damage is subject to a personal assessment by national judges according to the national law of the competent court.[22] Under the nuclear liability conventions, the nature and extent of compensation for such damage are determined by national law.[23] Consequently, in the case of a major nuclear accident, such as the Chernobyl accident, it is not possible to provide compensation for all the environmental damage caused by a nuclear accident, unless all the elements of the nuclear damage have been assessed. Therefore it is important to determine the scope of nuclear damage, particularly because under the nuclear liability conventions liability for nuclear damage is governed by a limited amount of compensation, estimated for each nuclear accident.

Reference should be made to the definition of nuclear damage as adopted in the Amended Vienna and Paris Conventions, which is based on definitions of damage in other instruments of liability, particularly those related to hazardous activities, such as pollution of the environment, and other instruments related to the protection of the environment in international law and State practice. The blueprint for these instruments is the 1992 Convention on Civil Liability for Oil Pollution Damage.[24] The same definition of damage caused by hazardous activities as defined in this Convention was used in the Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal.[25]

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[21] Article I (1) (k) of the Amended Vienna Convention; Article I (f) of the Convention on Supplementary Convention; Article 1 (a) (vii) of the Amended Paris Convention. For the definition of the concept of nuclear damage, see Fiona Wagstaff, "The Concept of Nuclear Damage under the Revised Paris Convention", in: Norbert Pelzer (ed.), "Die Internationalisierung des Atomrechts (Internationalizing Atomic Energy Law)", Tagungsbericht der AIDN/INLA-Regional tagung am 2. und 3. September 2004 in Celle, Norms Verlagsgesellschaft, Baden-Baden 2005, pp. 197-206; Måns Jacobsson, "The Regime of Compensation for Oil Pollution Damage and the Convention on Nuclear Third Party Liability- A Comparison", in: International Nuclear Law Association (INLA), Nuclear Inter Jura' 89, 1989-Nuclear Law for the 1990's- Tokyo, Japan September 25-28, 1989, Proceedings (for participants only), Tokyo, Japan 1989, pp. II-81 to II-100, at pp. II-89 to II-100.

[22] Exposé des Motifs of the 1960 Paris Convention, para. 39; Article I (k) (ii) of the Vienna Convention.

[23] Article 11 of the Paris Convention; Article VIII of the Vienna Convention.

[24] Birnie and Boyle, 2002, at p. 484; Vedran Šoljan, "The New Definition of Nuclear Damage in the 1997 Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage", in: OECD/NEA and IAEA, 2000, pp. 59-83, at p. 77.

[25] See, Article 2 (c) of the 1999 Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal.

Therefore, the definition of compensable environmental nuclear damage in the amended nuclear liability conventions is similar to the definition of damage in those instruments.

Like the nuclear liability conventions, the ILC Draft principles on the allocation of loss define compensable damage in general. These principles provide only for heads of damage without defining the scope and extent of recoverable damage. According to these principles, "damage" means significant damage caused to persons, property and the environment. More specifically, the definition of damage under these draft principles covers: loss of life or personal injury; loss of, or damage to property including property which forms part of the cultural heritage; loss or damage to the environment; the costs of reasonable measures to reinstate the impaired environment, including natural resources; and the costs of reasonable response measures.[26] In contrast, the ILC Draft Articles on State responsibility for wrongful acts do not define the concept of recoverable damage because it was deemed that it is covered by the primary rules of international liability for lawful acts, rather than by State responsibility for wrongful acts.[27] However, the absence of a definition may cause some confusion, ambiguities and uncertainty about the application of State responsibility norms to environmental nuclear damage. Consequently, 'the ambiguities in the threshold of harm contribute to the general confusion regarding the working of the law of State responsibility in relation to the environment'.[28]

This Protocol was adopted at the Fifth Conference of the Parties on 10 December 1999. The text of the Protocol is available at: http://www.basel.int/pub/protocol.html (accessed on 18.4.2012).

[26] Article 2 (a) of the 2006 ILC Draft principles on the allocation of loss.

[27] J. Crawford, Special Rapporteur, First Report on State Responsibility, International Law Commission, Fiftieth session, Geneva, 20 April-12 June 1998, New York, 27 July-14 August 1998, UN Doc. A/CN.4/490/Add.4 (1998), para. 117.

[28] Malgosia Fitzmaurice, "International Responsibility and Liability", in: Daniel Bodansky, Jutta Brunnee and Ellen Hey (eds.), The Oxford Handbook of International Environmental Law, Oxford University Press, New York 2007, pp. 1010-1035, at p. 1015.

3.4 Scope of reparable damage caused by a nuclear accident

3.4.1 Material and physical environmental damage

3.4.1.1 Personal damage

As noted, the nuclear liability conventions define compensable personal damage caused by a nuclear accident, as "damage to or loss of life of any person",[29] without giving any definition of such damage. This restricted definition of nuclear damage does not determine whether or not the concept of nuclear damage covers other damage related to personal damage, such as immaterial damage caused as a result of the impaired environment. This gives the competent court the flexibility to decide whether or not to include such damage in the concept of nuclear damage. Moreover, the phrase "any person" and the relationship between the injured person and other persons who suffer injuries as a result of a nuclear accident are not clearly defined. There is no indication that the phrase refers only to natural persons or whether it also refers to any other legal person who has a relationship with the injured person, including legal persons such as companies and institutions, and international persons such as States and international organizations. Also, the phrase "any person" is inappropriate for the person who has suffered nuclear damage, and should be replaced by the word "victim". Under the ILC Draft principles on the allocation of loss, the definition of victim is more specific and means 'any natural or legal person or State that suffers damage'.[30] This concept of persons who have suffered damage allows the State itself, its subjects and legal persons with independent legal personality, such as companies or other legal institutions, to receive compensation if they suffer nuclear damage resulting from the impaired environment caused by a nuclear accident. In addition, the State is a victim, when the nuclear damage is caused by a nuclear accident in a nuclear installation located in the territory of another State or under its jurisdiction or control. This is because nuclear damage suffered by citizens of the State is considered to be indirect moral damage suffered by the State itself.[31] The State is obliged to protect its

[29] Article 3 (a) (i) of the Paris Convention; Article I (k) (i) of the Vienna Convention.
[30] Article 2 (f) of the 2006 ILC Draft principles on allocation of loss.
[31] Garcia Amador stated, '…tout dommage à la personne ou aux bien d' un étranger constitue en même temps un prejudice moral à l'Etat don't il est ressortissant'. The sixth report to the ILC, at p. 11. Cited in S. M. Fadel, "International Responsibility for Damage by the Use of Nuclear Energy at the Peacetime", (Arabic edition) Cairo 1976, at p. 97.

citizens from damage caused by another State.[32] Thus the term "victim" is also an appropriate term for the State and its subjects if they suffer damage as a result of the impaired environment.

As regards the scope of personal damage caused by a nuclear accident, a person exposed to radioactivity may receive a fatal or harmful dose causing permanent or temporary physical injury or suffer genetic effects as a result of excessive exposure to radioactivity.[33] 'The term radiation exposure refers to any occasion on which a human or other animal or a plant has been placed in the presence of radiation from a radioactive source'.[34] A person exposed to radioactivity can suffer from physical or immaterial damage if he has been exposed to a certain level of radioactivity above the permitted legal limit.[35] However, the injured person must prove that the damage was caused by a nuclear accident in a nuclear installation or caused by nuclear substances.[36]

Physical damage may involve damage to the body of the injured person or to his heritage. Bodily injury covers the death or any other physical injuries caused to the person exposed to radioactivity. Such damage can be recognized either immediately after the exposure to radioactivity, or a long time after a nuclear accident in case of latent damage. It is easy for victims of a nuclear accident to prove the causal link between the damage suffered and the accident in the case of immediate injury. However, it is difficult to prove causality in the case of latent injuries because the damage may take a few decades to develop. In addition, the reasons for the damage may vary as it may be associated with other diseases, or may result from a combination of nuclear and non-nuclear damage, or be caused by low levels of radioactiv-

[32] Dickson Car Wheel Company, (U.S.A.) v United Mexican States, Dickson Car Wheel Company (U.S.A.) v United Mexican States, July 1931, RIAA, Vol. IV, pp. 669-691, at p. 678.

[33] Emmanuel du Pontavice, "Compensation for Transfrontier Pollution Damage", in: NEA, 1977, pp. 409-487, at p. 412.

[34] See Science Clarified, "Radiation Exposure", date last visited, 18 March 2009 at: http:www.scienceclarified.com.Qu-Ro/Radition-Eposure.html

[35] See generally, Douglas M. Muller and Julius H. Hines, "Personal Injury", in: TMLJ, Vol. 22, 1997-1998, pp. 513-533.

[36] El Shaaraoui, 1992, at p. 56; Zaki Zaki El Shaaraoui, Essai d'une théorie générale de la responsabilité dans le domaine nucléaire, Vol. I, Thèse-Un. de Paris I, Sorbonne, 1981, at p. 122.

ity.[37] For example, cancer may take a long time to appear, and may be the result of exposure to radioactive substances, or it may have other causes.[38]

Hereditary damage is also caused by exposure to radioactive materials, but the injured person is usually not the person who was exposed to radiation. This damage may result in the infertility of the person exposed to radiation, or in birth defects. However, it is more difficult to prove hereditary damage than bodily injuries. This is because in most cases, hereditary damage appears a long time after the injured person's exposure to radioactivity.

In addition, a nuclear accident may cause immaterial damage to the persons exposed to radiation and their relatives, for example, their children or parents or other relatives who witnessed the accident, particularly people who live near the place of the accident. In most cases therapy for psychological injuries takes longer than physical damage. This is because the person exposed to the nuclear accident may remember the accident for a long time, and find it difficult to forget. For example, the victim may be haunted by memories of the accident throughout his life. The Chernobyl accident is a good example of this. It had a psychological impact on children who were exposed to radiation caused by the accident in many countries, as well as those who lived in the vicinity of the accident. It is also expected that the accident will affect generations to come.[39] A report drawn up by the Greenpeace organization in 2006 on the effects of the Chernobyl accident twenty years later showed that it led to severe psychological and mental disorders in many people exposed to the radiation caused by the accident, particularly children.[40] According to this report, '[t]he UN Chernobyl Forum Expert Group "Health" (EGH) (World Health Organization 2005) has outlined four

[37] Ham, Yim and Kim, 1998, at p. 493; see also, Jean Hébert, "Note on Probability Factor in Establishing Causation", Nuclear Inter Jura '87, Proceedings 20-24 September 187, Antwerpen, 1987, pp. II-5 to II-18.

[38] 'Acute exposures in atomic-reactor accidents may be of very high intensities, and even higher intensities may result from immediate radiation of atomic explosions. In contrast to such acute, high-intensity exposures are well-controlled chronic exposures occurring in certain occupational groups and those resulting from natural background radiation, from radioactive contamination by atomic waste, and by fall-out'. Curt Stern, "Principles of Human Genetics", W. H. Freeman and Company, San Franciso and London, 1960, at p. 497.

[39] See generally, Adi Roche, "Children of Chernobyl", Fount, Harper Collins Publisher, London, 1996.

[40] Greenpeace report on "The Chernobyl Catastrophe Consequences on Human Health", prepared by Greenpeace, Amsterdam, the Netherlands, April 2006, ISBN 5-94442-013-8, at pp. 95-108, available at: http://hps.org/documents/greenpeace_chernobyl_health_report.pdf (accessed on 6.3.2012).

related areas of concern: stress-related symptoms; effects on the developing brain; organic brain disorders in highly exposed clean-up workers, and suicide'.[41]

3.4.1.2 Property damage

Like personal damage, the nuclear liability conventions and the ILC Draft principles on the allocation of loss refer to "loss of or damage to property" generally,[42] without determining the scope, nature and extent of compensable property damage. This was left to the judgement of the competent court. Nevertheless, the definition of the words "damage or loss to property" may indicate the scope of property damage covered under the conventions. In defining these words, Black's Law Dictionary states that:

> 'The word is also commonly used to denote everything which is the subject of ownership, corporeal or incorporeal, tangible or intangible, visible or invisible, real or personal; everything that has an exchangeable value or which goes to make up wealth or estate. It extends to every species of valuable right and interest and includes real and personal property, easements, franchises and incorporeal hereditaments, and includes every invasion of one's property rights by actionable wrongs'.[43]

This definition is exclusive and general, and includes the material and immaterial value of the damaged or lost property. Tort law also states, with regard to "damage or loss to property", that 'any infringement on any rights resulting in a diminishing of a value of such rights should be compensable'.[44] This definition expands the concept of nuclear damage to cover material loss or damage to property itself, and economic damage caused as a result of loss of property and profits, as well as damaged property as a result of the impaired environment.

The scope of damage or loss to property resulting from a nuclear accident may include a third party, property in general or property on the site of a nuclear installation or the installation itself. It is divided into two main catego-

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[41] Ibid, at p. 95.

[42] Article I (1) (k), (ii) of the Amended Vienna Convention; Principle 2 (a) (ii) of the 2006 ILC Draft principles on allocation of loss.

[43] Black's Law Dictionary (Abridged 6th Edition 1991), at p. 846, as quoted from State of Michigan in the Supreme Court, judgment of appeal dated August 2006, Supreme Court No. 130748, at p. 9, at: http://courts.michigan.gov/supremecourt/Clerk/11-06/130748/130748-AppelleesSupp.pdf (accessed on 14.2.2012).

[44] Catarina Holtz, "The Concept of Property and Related Issues in Liability Law-Possible Implications for the Paris Convention on Third Party Liability in the Field of Nuclear Energy", in: NLB, No. 40, 1987, pp. 87-98, at p. 88.

ries:[45] the first includes direct damage to property caused as a result of direct exposure to radiation. This may include, for example, contaminated places exposed to radiation such as houses, burned cars, livestock, hospitals, industrial and commercial companies and places affected by the nuclear accident, etc.[46] It also includes property damage resulting from fire, explosion and pollution caused by a nuclear accident, as well as land unfit for use for a period of time due to the widespread pollution caused by the accident, or any other property damaged as a result of a nuclear accident.[47] The second category is indirect damage (so-called "economic loss") caused because a person is prevented from using or benefiting from or enjoying properties or from visiting places contaminated by radioactivity. This may involve loss or damage of goods, including an embargo on the sale of goods or on production, as well as loss of benefit or profit as a result of the exposure to radiation, such as the closure of a factory or company.[48]

There is no doubt that according to the interpretation of the rules governing liability for nuclear damage and on the basis of evidence presented to the competent court, material damage caused by a nuclear accident can be covered by the nuclear liability conventions, and other norms of international law. However, in relation to immaterial damage, it is difficult for the court to identify the reality of such damage,[49] and to provide an accurate assessment, for example, of the enjoyment of a valuable picture damaged as a result of a nuclear accident.

3.4.1.3 Environmental damage

The 1960 Paris Convention and the 1963 Vienna Convention do not refer to nuclear damage caused to the environment and other related damage. This was left to the judgement of the competent court in accordance with the applicable rules of the ordinary national law, if it provides for this.[50] Unfortunately, few of the national laws which have been adopted on the protection of the environment define environmental damage in general.[51] Therefore the

[45] Similar damage caused by accidents in the field of oil pollution see, Jacobson, 1989, at p. II-93.
[46] El Shaaraoui, 1992, at p. 25; El Shaaraoui, 1981, Vol. I, at p. 121.
[47] Ham, Yim and Kim, 1998, at p. 493.
[48] El Shaaraoui, 1992, at p. 25; El Shaaraoui, 1981, Vol. I, at p. 121.
[49] Wolfrum and Langenfeld et al, 1999, 1999, at p. 77.
[50] Exposé des Motifs of the 1960 Paris Convention, Para. 39; Article I (k) (ii) of the Vienna Convention.
[51] For the definition of environmental damage in national law see, e.g., the British Environmental Protection Act 1990, Section 1 (3); the Slovenian Environmental Protection Act of June 1993, section 1 (4); the Bulgarian Environmental Protection Act of October

Amended Vienna Convention, the Convention on Supplementary Compensation, and the Amended Paris Convention included environmental damage under other headings of nuclear damage covered by these conventions. However, the scope and extent of compensable environmental nuclear damage has also been left to the judgement of the competent courts in accordance with national law.[52]

In the absence of a description of the scope of environmental nuclear damage under the nuclear liability conventions, it should be considered in the light of other instruments related to the environment in the field of international law.[53] There are certainly considerable numbers of bilateral and multilateral agreements in the field of environmental law which cover environmental damage, especially instruments related to liability for pollution and damage caused to the environment by hazardous activities. These instruments serve as a useful guide and can be helpful to define the scope of compensable nuclear damage.[54]

However, it was considered that if there is no precise and specific definition of the scope of environmental damage in the nuclear liability conventions, the definition of the environment itself defines environmental damage, as well as its scope and extent.[55] Therefore this section first defines the "environment" and then "compensable environmental damage".

3.4.1.3.1 Definition of the environment

It should be noted that it is very difficult for international lawyers and other professionals in the field of science to give a precise definition of the environment.[56] This is because to define the environment, it is necessary to as-

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1991. See Alexandre Kiss and Dinah Shelton, "Manual of European Environmental Law", Second edition, Grotius Publications, Cambridge University Press, UK 1997, at p. 6; The South Australian Environmental Protection Act 1993, Section 5.

[52] Patrick Blanchard, "Responsibility for Environmental Damage under Nuclear and Environmental Instruments: A Legal Benchmarking", in: JNRL, Vol. 18, Issues 3, 2000, pp. 233-253, at p. 235.

[53] Patrick Blanchard, "Responsibility for Environmental Damage Caused by Nuclear Accident", in: Nuclear Inter Jura 1999, Proceedings, October 24-29, 1999, Washington, D.C. USA, pp. 283-296, at p. 283; Philippe Sands, "Observation on International Nuclear Law Ten Years After Chernobyl", in: RECIEL, Vol. 5, No. 3, 1996. pp. 199-204, at p. 200; Philippe J. Sands, "Liability for Environmental Damage and the Report of the UNEP Working Group of Experts", in: Timoshenko (ed.), 1998, pp. 1-22, at p. 5.

[54] Timoshenko (ed.), 1998, at p. 123.

[55] For definition of environmental damage, see Sands, 1998, at p. 4; YILC, 1995, Vol. II, Part Two, at p. 86, para. 377; Mensah, 1998, at p. 62.

[56] 'During the last half century or so, the term "environment", has become a buzz-word, resorted to in all sorts of contexts, resulting, therefore, in imperfect, unclear, even mis-

sess all the elements and items in the environment, which are usually interrelated. Moreover, 'it is difficult both to identify and to restrict the scope of such an ambiguous term, which could be used to encompass anything from the whole biosphere to the habitat of the smallest creature or organism'.[57] In addition, international environmental law has only recently emerged in the body of international law. The term "environment" appeared in international law in the mid-1960s with the emergence of international environmental law,[58] as part of international law, not separate from it.[59] The term environment was used as an official legal term for the first time in the 1972 United Nations Conference on the Human Environment (Stockholm Conference). This referred to the "environment" without giving a definition of the term.[60] It is worth mentioning that in the preparatory activities for the Conference, the term "milieu humain" was adopted in the initial text and documents of the Conference to express the concept of the environment. However, in other meetings of the Conference afterwards, this was replaced by the term "environment", as it was considered more convenient.[61] Similarly, the Final Declaration of the 1992 Rio de Janeiro Conference on Environment and Development referred to the environment without providing a definition of the

leading dialogues and the oversimplified reduction of complex matters to a single codeword'. Cesare P. R. Romano, "The Peaceful Settlement of International Environmental Disputes: A Pragmatic Approach", International Environmental Law and Policy Series, Vol. 56, Kluwer Law International, The Hague/Boston, 2000, at p. 15.

[57] Birnie and Boyle, 2002, at p. 4.

[58] As Kiss observed: 'It may be considered that environmental law exists as such since the second half of the 1960s and that in particular, international environmental law appeared about 1968 with the first proclamation of general principles concerning water conservation and air pollution control and with the decision of the UN General Assembly to organize a worldwide conference on the protection of the human environment. The result of this decision was the Stockholm Conference convened in June 1972, which can be regarded as a milestone in the short but rather rich history of international environmental law'. Alexandre Kiss, "The International Protection of the Environment", in: R. St. J. Macdonald and Douglas M. Johnston (eds.), The Structure and Process of International Law: Essays in Legal Philosophy Doctrine and Theory, Matinus Nijhoff Publishers, The Hague/Boston/Lancaster, 1983, pp. 1069-1093, at p. 1070. See also, Kiss and Shelton, 1997, at p. 12.

[59] Birnie and Boyle, 2002, at p. 1.

[60] See the Report of the United Nations Conference on the Human Environment, (Stockholm, 5-16 June 1972). United Nations, New York, A/CONF.48/14/Rev.1 (New York, 1972), Preamble, para. 1; http://.unep.org/Documents/Default.asp?DocumentsID=97&ArticleID=1503

[61] Amer, 1981/1982, footnote 3, at p. 1.

term "environment".[62] Since the adoption of these Declarations, the term "environment" has been used in the formulation of international practice and widely adopted in many instruments in international law. However, although the Stockholm Declaration does not contain a definition of the environment, it refers to the natural resources of the earth including air, water, land and other natural resources and ecosystems.[63]

Furthermore, 'although "environment" does no have generally accepted usage as a term of art under international law, recent agreements have consistently identified the various media included in the term'.[64] The environment was broadly defined in environmental law instruments in such a way as to include both the cultural heritage and natural resources, including water, soil, fauna and flora, and their interaction, property which forms part of the cultural heritage, the landscape and environmental amenities.[65] This broad definition of the "environment" has been incorporated in international treaties and agreements, state practices, practices of international organizations, regional agreements as well as in national laws.[66] The model definition of the environment is given in the 1993 Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (the 1993 Lugano Convention).[67] This Convention defines the environment as natural resources, both abiotic and biotic, such as air, water, soil, fauna and flora and the interactions between them; property which forms part of the cultural heritage; and the characteristic aspects of landscape.[68]

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[62] For the Rio Declaration on Environment and Development, see the Report of the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), A/CONF.151/26 (Vol. I); http:www.un.org/documents/ga/conf151/aconf15126-lannex1.htm

[63] Principle 2 of the 1972 Stockholm Declaration.

[64] Philippe Sands, "Principles of International Environmental Law", Second Edition, Cambridge University Press, UK, 2003, at p. 16.

[65] Björn Sandvik and Satu Suikkri, "Harm and Reparation in International Law Treaty Regimes: An Overview", in: Peter Wetterstein (ed.) Harm to the Environment: The Right to Compensation and the Assessment of Damages, Clarendon Press. Oxford, 1997, pp. 57-71, at p. 60.

[66] Sands, 1998, at p. 5.

[67] Convention on Civil Liability for Damage Resulting Activities Dangerous to the Environment, adopted in Lugano on 21 June 1993 under the auspices of the Council of Europe, 32 ILM (1993) 1228 (Lugano Convention); http://conventions.coe.int/Treaty/en/Treaties/World/150.doc

[68] Article 2 (10) of the 1993 Lugano Convention; see also, "Communication from the Commission to the Council and the Parliament and the Economic and Social Committee: Green Paper on Remedying Environmental Damage", Commission of the European Communities, COM(93) 47 final, Brussels, 14 May 1993, at p. 10.

This broad and exclusive definition of the concept of the environment is reflected in the formulation of the definition of the environment in the ILC Draft principles on the allocation of loss. According to these principles, 'the 'environment' includes natural resources, both abiotic and biotic, such as air, water, soil, fauna and flora and the interaction between the same factors; and the characteristic aspects of the landscape'.[69] These elements are complicated and interrelated, and form the framework, setting and living conditions of mankind with their influence and impact.[70] This definition of the environment is too broad, difficult to implement in practice, and depends on what a Contracting Party wants. Therefore, the recent trend in international law is in favour of a broad definition of the environment which can be easily implemented in practice. The narrow approach would be adopted if the broad definition led to unreasonable results.[71]

The 1988 Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) also provided a restricted definition of the environment.[72] As we will see, this convention incorporated the definition of the Antarctic environment, as well as a definition of environmental damage caused to the ecosystem of the Antarctic environment. National environ-

[69] Article 2 (a) of the 2006 ILC Draft principles on the allocation of loss.

[70] Larsson, Scandinavian Studies in Law, Vol. 38, 1999, at p. 156.

[71] Timoshenko (ed.), 1998, at p. 123.

[72] See, Article 1 (15) of this Convention. The 1988 Convention on the Regulation of Antarctic Mineral Resources Activities (CRAMRA) is one of the agreements concluded within the framework of the Antarctic Treaty system. Activities of states in Antarctica have been regulated since the conclusion of the Antarctic Treaty (Washington, 1 December 1959), which establishes a regime for international cooperation in Antarctica. For other related treaties see, "The Antarctic Treaty", concluded in Washington on 1 December, 1959, entered into force on 23 June 1961, http:sedac.ciesin.org/entri/texts/acrc.at.txt.html; "Agreed Measures for the Conservation of Antarctic Fauna and Flora", concluded in Brussels on 2 June 1964, entered into force on 1 November 1982, http:sedac.ciesin.org/entri/texts/acrc/aff64.txt.html (accessed on 13.4.2012); "Convention for the Conservation of Antarctic Seals", concluded in London on 1 June 1972, entered into force on 11 March 1978, available at: http://www.antarctica.ac.uk/about_antarctica/geopolitical/treaty/update_1972.php (accessed on 13.4.2012); "Convention on the Conservation of Antarctic Marine Living Resources", concluded in Canberra on 20 May 1980, came into force on 1982, http://www.antarctica.ac.uk/about_antarctica/geopolitical/treaty/convention.php (accessed on 13.4.2012); "Convention on the Regulation of Antarctic Mineral Resource Activities", concluded in Wellington on 2 June 1988, http:sedac.ciesin.org/entri/texts/acrc/cramra.txt.html; "Protocol on Environmental Protection to the Antarctic Treaty, done at Madrid, Oct. 4, 1991, 30 ILM 1455 (1991), S. Treaty Doc. No. 102-22 (1992), http:sedac.ciesin.org/entri/texts/Antarctic.treaty.protocol.1991.html.

mental law has also adopted a restrictive definition of the environment, sometimes for a particular purpose.[73]

The doctrine of international law has also made some attempts to define the environment. In general, Barboza, the former Special Rapporteur of the ILC, simply defines the environment as the environment in which mankind lives, or as the human environment. This definition covers all the aspects and elements of the lives of human beings. However, according to Barboza, this definition of the environment excludes the harmful consequences of the environment on human health and on property, which would be covered by the definition of the concept of environmental damage.[74] Similarly, Amer defines the environment as the total surroundings in which human beings live, and by which they are affected (as well as affecting them). In that context, this definition is exclusive and comprises all the natural and industrial elements of the environment. The natural elements fall under the wider meaning of the definition of the environment. This includes all cultural and civilized elements of the environment. However, the industrial elements fall under a narrow definition of the environment. This includes the physical elements of the environment, in which human beings live.[75]

These wide definitions of the environment mean that a distinction can be made between three interrelated terms: "ecosystem", "nature" and "environment". The ecosystem is 'the complex of an ecological community and its environment functioning as a unit in nature'.[76] The 1992 Convention on

[73] Under the New Zealand Environment Act of 1986, the environment includes: ecosystems and their constituent parts; all natural and physical resources; the social, economic, aesthetic and cultural conditions which are affected by changes to the environment. (Larsson, Scandinavian Studies in Law, Vol. 38, 1999, at p. 156) Also, a restrictive definition of the environment is provided for under Articles 5 (1) (1) of the Slovenian Environment Protection Act of 1993. It defines the environment as 'that part of nature which is or which could be influenced by human activity'. (Kiss and Shelton, 1997, at p. 4) Similarly, a narrow definition of the environment for a particular purpose is provided for under Section 1 (2) of the English Environment Protection Act 1990 under which 'the environment consists of all, or any, of the following media, namely, the air, water and land; and the medium of air includes the air within the buildings and the air within other natural or man-made structures above or below ground'. (Kiss and Shelton, 1997, at p. 5) According to the South Australian Environmental Protection Act 1993, Section 5, environmental damage is any damage or potential damage to the environment regardless of whatever degree or duration including an environmental nuisance and anything declared by regulation or by an environment protection policy to be environmental damage.

[74] Julio Barboza, "Environmental Damage", in: Timoshenko (ed.), 1998, pp. 97-99, at p. 97.

[75] Amer, 1981/1982, at p. 1.

[76] The Franklin Language Master Electronic Dictionary.

Biological Diversity[77] also defines "ecosystem" as 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit'.[78] This ecological system involves the surroundings of a particular unit of the natural world, and its relationship with the physical environment.[79] This is a narrower definition of the environment because the rules established under this system only govern a particular sector of the general environment such as the "Antarctic" and or the "marine environment". In contrast, the term "nature" is a broader concept of the environment than the concept of the ecosystem. It includes the primary elements of nature used by man, such as land, water, animals, and other elements contained in nature. However, the term "environment" consists of the natural elements of nature and other manufactured elements, which are added to nature by man.[80] The physical sense of the environment, as indicated in that concept, is the one that concerns the definition of recoverable environmental damage, as discussed below.

3.4.1.3.2 Definition of environmental nuclear damage

As the Chernobyl accident showed, the enormous amount of nuclear damage caused by the accident affected the agricultural production of citizens of many countries, as well as the general environment. However, the nuclear liability conventions do not provide a definition of environmental nuclear damage. In my opinion, environmental nuclear damage is defined as the harmful consequences of new elements which are produced by a nuclear accident and are introduced into the environment, adversely affecting it. As the environment refers to everything on the planet, radioactive elements which affect the environment as a result of a nuclear accident may affect a specific sector of people and/or the global community in general or the global commons. This is because 'all damage occurring on the Earth can be understood as damage to the environment'.[81] Furthermore, Pelzer defines environmental damage as '…every kind of decrease of the quality of life which is caused by a certain occurrence or a series of occurrences, and which affects the whole population in a certain region'.[82]

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[77] For the text of the Convention see, http://www.biodiv.org/convention/articles.asp?lg=0&a=cbd-02

[78] Article 2 of the 1992 Convention on Biological Diversity.

[79] Amer, 1981/1982, at pp. 75-76.

[80] Amer, 1981/1982, at pp. 2-3.

[81] Tadeusz Gadkowski, "International Liability of State for Nuclear Damage", Adam Mickiewicz University Press, Poznan, Eburon-Delft, the Netherlands, 1989, at p. 56.

[82] Norbert Pelzer, "Compensation for Nuclear Damage Caused to the Environment in Relation to the Paris and Vienna Conventions", Working Paper presented at the Informal

Environmental damage is also defined in numerous international instruments related to the protection of a State, as an injured party, and civil liability for damage caused to the environment by private activities.

In relation to State liability, instruments which define environmental damage include the 1988 Convention on the Regulation of Antarctic Mineral Resources (CRAMRA), which has not entered into force.[83] This Convention defines environmental damage caused to the Antarctic environment, as 'any impact on the living or non-living components of that environment or those ecosystems, including harm to atmospheric, marine or terrestrial life, beyond that which is negligible or which has been assessed and judged to be acceptable pursuant to this Convention'.[84] The broadest concept of environmental damage is defined in the 1992 Framework Convention on Climate Change. This Convention defines environmental adverse effects as 'changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare'.[85] This definition is derived from the definition given in the 1985 Convention for the Protection of the Ozone Layer.[86] In its Draft Articles on international liability for acts not prohibited by international law, the ILC included in Article 24 damage to the environment and damage to persons or property.[87]

Meeting of Experts Concerning the Relationship Between the Paris and Vienna Conventions, Vienna 1986, at p. 7, cited in Šoljan, 2000, at p. 74; also see Gadkowski, 1989, at p. 56.

[83] Philippe Sands, Ruth Mackenzie & Ruth Khalastchi, "Background Paper for the UNEP Working Group of Experts on Liability and Compensation for Environmental Damage Arising from Military Activities", in: Timoshenko (ed.), 1998, pp. 25-58, at p. 41; Sands, 1998, at p. 5.

[84] Article 1 (15); See the text of the Convention, 27 I.L.M. 859 (1988); http://sedac.ciesin.columbia.edu/entri/texts/acrc/cramra.txt.html (accessed on 13.4.2012). The Convention was adopted in Wellington on 2 June 1988, reproduced in: (Hohman, (ed.), Vol. 3, 1992): Harald Hohman, (ed.), "Basic Documents of International Environmental Law", Graham & Trotman Ltd./Kluwer Academic Publishers Group, London/Dordrecht/Boston, Vol. 3, 1992, at p. 1429; Sandvik and Suikkri, 1997, at p. 60.

[85] Article 1 (1) of the Climate Change Convention.

[86] Article 1 (2) of the Protection of the Ozone Layer Convention provides '"Adverse effects" means changes in the physical environment or biota, including changes in climate, which have significant deleterious effects on human health or on the composition, resilience and productivity of natural and managed ecosystems, or on materials useful to mankind'.

[87] The Sixth report on international liability for injurious consequences arising out of acts not prohibited by international law, by Mr. Julio Barboza, Special Rapporteur, DOCUMENT A/CN.4/428 and Add.l, at pp. 96-97, paras. 52-54.

Environmental damage has been defined in numerous international instruments which deal with civil liability for environmental damage. For example, Article 2 (7) (c) of the 1993 Lugano Convention defines environmental damage as 'loss or damage by impairment of the environment in so far as this is not considered to be damage within the meaning of subparagraphs a or b above [Article 2(7)(a) or (b)] provided that compensation for impairment of the environment, other than for loss or profit from such impairment, shall be limited to the costs of measures of reinstatement actually undertaken or to be undertaken…' Similar definitions are given by other instruments which deal with civil liability for environmental damage.[88]

An exclusive and elaborated definition of the concept of environmental damage is given in Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on Environmental Liability with regard to the Prevention and Remedying of Environmental Damage. In Annex V the directive refers to the nuclear liability conventions. It establishes a strict liability regime for dangerous activities, and a fault liability regime for non-dangerous activities. The Directive defines environmental damage as:

> '(a) damage to protected species and natural habitats, which is any damage that has significant adverse effects on reaching or maintaining the favourable conservation status of such habitats or species. The significance of such effects is

[88] For example, Article 1 (c) of the United Nations Economic Commission for Europe (ECE) Convention on Transboundary Effects of Industrial Accidents; Article 1 (2) of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, done at Helsinki, March 17, 1992, 1936 U.N.T.S. 269; Article 1 (15) (c) of the 1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS Convention); Article 8 (2) (a), (b) and (d) of the Convention on the Regulation of Antarctic Mineral Resources Activities (CRAMRA); Article 1 (2) of ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes; Article 9 (c) and (d) of the Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD), adopted at Geneva on 10 October 1989, Doc. ECE/TRANS/79 (not in force), available also at: http://www.unece.org/trans/danger/publi/crtd/crtd_e.html (accessed on 3.9.2010); http://www.transportrecht.org/dokumente/CRTDengl.pdf (accessed on 13.4.2012); Article I (6) (a) of the 1992 International Convention on Civil Liability for Oil Pollution Damage defines "Pollution damage" as: 'loss or damage caused outside the ship by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken'. The text of the Convention is available at: http://www.transportrecht.org/dokumente/HaftungsUe_engl.pdf (accessed on 16.4.2012).

to be assessed with reference to the baseline condition, taking account of the criteria set out in Annex I;

Damage to protected species and natural habitats does not include previously identified adverse effects which result from an act by an operator which was expressly authorised by the relevant authorities in accordance with provisions implementing Article 6(3) and (4) or Article 16 of Directive 92/43/EEC or Article 9 of Directive 79/409/EEC or, in the case of habitats and species not covered by Community law, in accordance with equivalent provisions of national law on nature conservation.

(b) water damage, which is any damage that significantly adversely affects the ecological, chemical and/or quantitative status and/or ecological potential, as defined in Directive 2000/60/EC, of the waters concerned, with the exception of adverse effects where Article 4(7) of that Directive applies;

(c) land damage, which is any land contamination that creates a significant risk of human health being adversely affected as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms'.[89]

However, the Directive does not contain a sufficient regulatory framework for liability for nuclear damage which can be consulted in the case of a nuclear accident. It only establishes a mechanism that internalizes the economic costs for the producer according to the polluter pays principle.[90] The Directive does impose public liability for environmental damage, but excludes damage to health of people and their property.[91]

3.4.1.3.3 Type of compensable environmental nuclear damage

In general, there are some differences within the doctrine of international law regarding the type of compensable environmental damage. Some arguments consider all compensable damage under the heading of damage as damage to the environment.[92] Therefore compensable environmental nuclear damage includes: damage caused to persons and property as a result of the impaired environment; damage caused to the environment per se; costs of

[89] Article II (1) of the Directive 2004/35/CE. The Directive reproduced in Hannes Descamps, Robin Slabbinck, Hubert Bocken (eds.), "International Documents on Environmental Liability", Dordrecht Springer, 2008, pp. 3-21.
[90] Danzi, 2010, at p. 192.
[91] Giovanni Cordini, "Environmental Damage-Comparative Law Profile", in: Giovanni Cordini & Amedeo Postiglione (eds.), Prevention and Remedying of Environmental Damage, Proceedings of the Workshop on Environmental Law, Ostia Antica, 27 & 28 May 2005, Bruylant Bruxelles, 2005, pp. 47-60, at p. 56.
[92] Gadkowski, 1989, at p. 56.

preventive measures to prevent and reduce damage to the environment; costs of the reinstatement of the impaired environment; and economic loss caused as a result of the impaired environment. However, other arguments exclude personal and property damage from environmental damage, even though such damage can be caused by environmental damage, assuming that personal and property damage is included under a separate heading of damage.[93] The same view was expressed by Sands, who argues that:

> 'In relation to environmental damage, however, the liability rules are still evolving and in need of further development. Environmental law refers here to damage to the environment, which has been defined in treaties and other international acts to include four possible elements: (1) fauna, flora, soil, water and climatic factors; (2) material assets (including archaeological and cultural heritage); (3) the landscape and environmental amenity; (4) the relationship between the above factors. Most legal definitions of the environment do not, therefore, include people and their property'.[94]

Moreover, according to the Special Rapporteur Barboza:

> 'Harm to the environment should be considered separately from harm to persons or private property, or from the State itself, since harm to the environment is more difficult to quantify: it involves harm to things such as air, water and space which cannot be appropriated, which are shared and used by everyone and do not belong to anyone in particular. Environmental harm may also be far more extensive than the other kinds of harm mentioned, however, and the priority is to attempt to restore the conditions that existed prior to the occurrence of the harm'.[95]

However, according to these arguments, the damage means pure environmental damage or pure ecological damage. This is because the definition of environmental damage in general includes damage to persons and property caused as a result of the impaired environment, the costs of preventive measures, the costs of restoring the impaired environment and economic loss caused to the environment. Accordingly, compensable environmental damage is divided into five categories: (1) environmental damage to persons and property; (2) the costs of the reparation of the pure environmental damage which has caused a reduction in the value of the environment itself or of the amenities of the environment. Such damage is recoverable because the deterioration of the environment constitutes a loss to the whole community; (3)

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[93] Timoshenko (ed.), 1998, at p. 123; Sands, 1998, at p. 4.

[94] Sands, 2003, at p. 869.

[95] Sixth report on international liability for injurious consequences arising out of acts not prohibited by international law, by Mr. Julio Barboza, Special Rapporteur, DOCUMENT A/CN.4/428 and Add.l, para. 52, at p. 96.

the costs of preventive measures taken to prevent or to reduce the harmful consequences of the damaged environment; (4) the costs of the restoration of the damaged environment to its *status quo ante* and the elimination of the harmful consequences of a nuclear accident and restoring the environment so that it has the same value and is in the same condition as before the accident; (5) economic loss to the environment related to the above-mentioned damage, which has been caused as a direct consequence of the damaged environment.[96] Each of these elements will be discussed in turn.

3.4.1.3.3.1 Environmental damage to person or property

It is difficult to separate damage caused by a nuclear accident to person and property, and damage to the environment itself. This is because there are certain common elements associated with such damage. Nuclear damage caused to the environment by a nuclear accident, can cause damage to persons and property at the same time.

The most relevant aspects of environmental nuclear damage caused to persons and/or property by a nuclear accident have been already covered and explained in the above-mentioned category of damage to persons and property.[97] In general, liability for damage caused to persons and property is determined in accordance with the ordinary law of tort and international liability regimes, which cover personal and property damage.[98] However, the provisions of tort law only apply where environmental damage caused by hazardous activities is characterized under tort law as environmental damage.[99] Usually the concept of "property damage" under the law of tort is too limited to cover transboundary nuclear damage, as nuclear damage caused to the environment by a nuclear accident may affect large areas of the environment, and most of the elements related to the environment, i.e., land, water and air, and ecosystems.

The concept of environmental damage as a category of nuclear damage may concern the contamination of the environment caused by a nuclear accident, which in turn causes damage to persons and property. The contamination can subsequently have a harmful impact on human life, leading to loss of life or personal injury. As mentioned earlier, as a result of Chernobyl accident, many European countries prevented the human consumption of the contaminated foodstuffs produced in the countries affected by the accident. The European Community Commission suspended imports of certain agricultural products of many European countries in order to reduce the effects

[96] Mensah, 1998, at p. 62.
[97] Barboza, 1998, at p. 97.
[98] Rosas, NJIL, 1991, Vol. 60, Issue 1/2, at p. 41
[99] Mensah, 1998, at p. 61.

of contamination caused by the accident. This also includes the actual or potential damage that might be caused to human health, damage to living or non-living resources, the "destruction or diminution of resources", the damage to amenities, the "destruction or reduction in natural, social or cultural amenities" and the damage to property, "damage to or loss of property".[100] Therefore, it was considered that the concept of personal and property damage would be given a broader definition to include such damage.[101]

3.4.1.3.3.2 Damage to the environment per se

Environmental damage per se is recognized as a separate category when damage has been caused purely to the environment and is not related to personal and property damage. Damage to the environment per se is referred to as "pure environmental damage" or "ecological damage". It is defined as 'any significant physical, chemical or biological deterioration of the environment'.[102] Introducing these substances may change the condition of the environment from good to bad. This may also lead to harmful consequences for persons and property. The Lac Lanoux Arbitration (France v. Spain) is an example of this. It implicitly refers to pure environmental damage, when it refers to changes in the temperature and other characteristics of the waters of the River Carol, and its effects on Spanish interests.[103] The Tribunal stated: 'It could have been argued that the works would bring about an ultimate pollution of the waters of the Carol or that the returned waters would have a chemical composition or a temperature or some other characteristic which could injure Spanish interests'.[104] This is also implicitly recognized by the ICJ in the Case Concerning the Gabčíkovo-Nagymaros Project, Hun-

[100] Mensah, 1998, at p. 61.

[101] As Rosas argues: 'One step forward is to give "property" a broad definition. It will be recalled that the concept of property may change over time, and that there has been a certain trend to enlarge the concept to "new" forms of property, including claim-rights, user-rights and even social rights, which are not necessarily "owned" in the traditional sense. Denial because of environmental harm of the right to the use of natural resources and environments could then to be considered as damage to property. If a State is the claimant, compensation could in such case be asserted e.g. for specific user-rights of private persons. Also "property of the state" […] could be given a broad meaning, to include, e.g., the continental shelf. There are, on the other hand, limits to the exoneration of the concept of property in this respect'. Rosas, NJIL, 1991, Vol. 60, Issue 1/2, at p. 41; Mahieu, 2010, at p. 90.

[102] Mensah, 1998, at p. 61.

[103] "Lake Lanoux Arbitration (France v. Spain) November 16, 1957", in: Hersch Lauterpacht and E. Lauterpacht (eds.), International Law Reports, (ILR) Vol. 24, 1957, pp. 101-142.

[104] ILR, 1957, at p. 123.

gary/Slovakia,[105] the Australia and New Zealand Nuclear Tests Cases, 22 June 1973 and 20 December 1974[106] and the Case Concerning Certain Phosphate Lands in Nauru (Nauru v. Australia), 26 June 1992.[107]

Pure environmental damage sometimes affects 'a particular sector or the whole of the environment which has a measurable adverse impact on the quality of the environment itself or on its ability to support and sustain an acceptable threshold of quality of life or viable ecological balance'.[108] Pure environmental damage may be caused, for example, by a nuclear accident on a nuclear-powered ship, or by a ship carrying nuclear substances, or by the illegal dumping of nuclear waste at sea. This inevitably contaminates the water itself, as well as marine life. Everything in the environment will be contaminated by radioactivity in the water as a result of the accident.

In addition, a distinction must be made between environmental damage and compensable environmental damage. This is because not all environmental damage can be compensated. The operator or the State is not liable for environmental damage below the levels permitted according to international standards. However, some treaties recognize liability for environmental damage simply if the environment is polluted, while other treaties stipulate that recoverable environmental damage must have adverse effects on man and the environment.[109] In this sense, the Special Rapporteur Barboza distinguishes between so-called "use services" and "non-use services".[110]

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[105] ICJ Reports, 1997, at p. 81, para. 152.

[106] ICJ Reports 1973, p. 99; ICJ Reports 1974, p. 253.

[107] ICJ Reports 1992, at p. 240. Also see Sands, 2003, at p. 463 and p. 877; Rüdiger Wolfrum, "Liability for Environmental Damage: A Means to Environmental Standards?" in: Karel Wellens, (ed.), International Law: Theory and Practice, Essays in Honour of Eric Suy, Martinus Nijhoff Publishers, The Hague/Boston/London, 1998, pp. 565-577, at p. 570.

[108] Mensah, 1998, at p. 61.

[109] Sands, 2003, at p. 877.

[110] As Barboza argues: '[T]he former include the commercial or recreational use of the environment, such as the use of a watercourse for fishing, the recreational use of water for swimming, sailing, water-skiing or racing, or the use of snow in mountains for similar sports. Non-use services might include the characteristic features of a landscape or even so-called "existence value", which are certain features of the environment for which the community would be prepared to pay simply in order to preserve them for themselves or for future generations. Obviously, some losses of service can be easily quantified; for example, commercial fishing would suffer a loss if an incident of river or lake pollution appreciably reduced the fish population. In other cases, it is more difficult to perceive the damage and even more so to evaluate it, such as when the loss of a recreational area causes moral inconvenience or frustration. However, the principle that harm which does not entail economic loss should be compensated is not a new absolute in law,

Thus environmental damage may include any adverse impact on man, his property and the environment, while compensable environmental damage refers to environmental damage covered by 'schemes of restitution and liability, and embraces only economic losses, or rather harm expressed in economic terms'.[111] Unfortunately, although the nuclear liability conventions cover environmental damage caused by a nuclear accident, they do not cover "pure environmental damage". This is because there are technical, environmental and financial reasons to prevent the reparation of pure environmental damage. However, excluding pure environmental damage from being covered by the nuclear liability conventions is unjustifiable, and contrary to the polluter pays principle, which obliges the polluter to pay for the economic burden resulting from his activity.[112] It was argued that victims of pure environmental damage can be compensated if the traditional methods used for calculating such damage are scrapped, and new guidelines to assist national courts in calculating such damage are developed.[113]

3.4.1.3.3.3 Costs of preventive measures

The Chernobyl accident demonstrated that preventive measures are necessary after a major nuclear accident to protect people and the environment from the harmful consequences of the accident. These measures cost enormous sums of money. As mentioned above, immediately after the accident, the inhabitants living in the vicinity were evacuated a long way from the accident area and the contaminated environment, in order to be protected from radioactivity. This cost the USSR Government and the victims of the accident considerable amounts of money.[114]

However, the costs of preventive measures were not included in the concept of nuclear damage in the Paris Convention and the Vienna Convention. This was left for the competent court to decide in accordance with national law. This means that determining the costs of preventive measures may vary from one court to another.[115]

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as can be seen in the universal acceptance, in domestic and international law, of compensation for moral injury, which is as difficult to evaluate in monetary terms as ecological harm'. Eleventh Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Julio Barboza, Special Rapportuer. UN Doc. A/CN.4/468, YILC, 1995, Vol. II, Part One, at p. 56, para. 21, para. 21.

[111] Larsson, Scandinavian Studies in Law, Vol. 38, 1999, at p. 159.

[112] Johan G. Lammers, "Compensation for Nuclear Damage under the Paris, Brussels and Vienna Conventions", in: HYIL, Vol. 16, 2003, pp. 47-79, at p. 54.

[113] Lammers, Vol. 16, HYIL, 2003, at p. 55.

[114] LEG/DOC (89)4, at p. 1.

[115] LEG/DOC (89)4, at p. 3.

Therefore, after the Chernobyl accident, the USSR suggested including the costs of preventive measures in the concept of nuclear damage in future amendments of the nuclear liability conventions.[116] Afterwards, the question was comprehensively examined by the IAEA Standing Committee and the NEA Group of Governmental Experts. The discussions on this matter were based on the concept of preventive measures as adopted in numerous international instruments in international law, which served as the basis of the concept of preventive measures under the nuclear liability conventions.[117] The concept of preventive measures was adopted in the Amended Vienna Convention, the Convention on Supplementary Compensation, and the Amended Paris Convention. These conventions cover the costs of preventive measures taken as a result of a nuclear accident, and other related loss, or damage resulting from taking such measures.[118]

According to the Amended Vienna Convention, the concept of preventive measures is defined as 'any reasonable measures taken by any person after a nuclear incident has occurred to prevent or minimize damage referred to in sub-paragraph (k) (i) to (v) or (vii), subject to any approval of the competent authorities required by the law of the State where the measures were

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[116] LEG/DOC (89)4, at p. 2.

[117] These instruments include, e.g., the 1969 Convention on Civil Liability for Oil Pollution Damage as amended by the 1984 Protocol (Article I); the draft Recommendation on the Application of the Polluter-Pays Principle to Accidental Pollution (NEA/LEG/DOC (89)4, at p. 3); the OECD Recommendation on the Implementation of the Polluter-Pays Principle of 14th November 1974; the 1977 Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration for and Exploitation of Seabed Mineral Resources (Article 1 (6) and 7); Convention on Limitation of Liability for Maritime Claims (Article 2. 1. (f)), adopted at London on 19 November 1976, available at: http://www.admiraltylawguide.com/conven/limitation1976.html (accessed on 3.4.2012); OECD Recommendation of the Council 1981 Concerning Certain Financial Aspects of Actions by Public Authorities to Prevent and Control Oil Spills, 20 April 1981, C(81)32/Final, available at: http://acts.oecd.org/Instruments/ShowInstrumentView.aspx?InstrumentID=29&Lang=en&Book=False (accessed on 25.4.2012); the 1989 Convention on Civil Liability for Damage Caused During Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD) (Article I (10) and (11)); the 1996 International Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances by Sea, adopted in London on 3 May 1996, 35 ILM 1406, (1996), available at: http://heinonline.org/HOL/Page?handle=hein.journals/intlm35&id=1320&collection=journals&index=journals/intlm (accessed on 14.2.2012); and the 1999 Basel Protocol on Liability and Compensation for Damage Resulting from the Transboundary Movement of Hazardous Waste (Basel, 10 December 1999, http://www.basel.int).

[118] Article 1 (a) (vii) (6) of the Amended Paris Convention.

taken'.[119] Similarly, the Amended Paris Convention defines the concept of preventive measures as 'any reasonable measures taken by any person after a nuclear incident or an event creating a grave and imminent threat of nuclear damage has occurred, to prevent or minimise nuclear damage referred to in sub-paragraphs (a) (vii) 1 to 5, subject to any approval of the competent authorities required by the law of the State where the measures were taken'.[120] This approach was also adopted by the ILC in its Draft Articles on international liability for damage caused by activities not prohibited by international law.[121] This concept of preventive measures is broadly defined to include all recoverable costs of preventive measures.[122] It includes any protective measures to be taken by States or by any individual affected by a nuclear accident. These measures may include, e.g., rescue operations, emergency assistance, and any other measures taken to prevent, or to mitigate the impact of radiation emitted by the accident from spreading to the population and the environment.[123]

According to these definitions of preventive measures, there are three conditions required for the compensation of costs of preventive measures to be taken as a result of a nuclear accident. First, preventive measures should be reasonable. "Reasonable measures" as defined under the nuclear liability conventions means that in accordance with the law of the competent court the adopted measures should be appropriate and proportionate, having regard to all the circumstances which constitute the concept of nuclear damage.[124] Nevertheless, the nuclear liability conventions do not provide a precise definition of "reasonable measures", or the criteria to be used as a guideline by

[119] Article I (1) (n) of the Amended Vienna Convention.
[120] Article 1 (a) (ix) of the Amended Paris Convention.
[121] Bruno Simma, "The Work of the International Law Commission at Its Fiftieth Session (1998)", in: NJIL, Vol. 67, No. 4, 1998, pp. 431-487, at p. 435.
[122] Gerrit Betlem, "Strict Environmental Liability and NGO Damages and Enforcement Claims: a Dutch and International Law Perspective", in: EELR, Vol. 10, No. 11, 2001, pp. 314-321, at p. 318, republished in Jens Hamer (ed.), Umwelthaftung in der EU (Environmental Liability in the EU, Köln, Bundesanzeiger, 2002, pp. 131-144; Larsson, 1999, at p. 184; J. Deprimoz, La notion de dommage nucleaire applique au cout des mesures preventives en cas de menace imminte de damages aux tiers "The Concept of Nuclear Damage Applied to the Costs of Preventive Measures in Case of Imminent Nuclear Peril Threatening Third Parties", in: OECD/NEA and IAEA, Nuclear Third Party Liability and Insurance: Status and Prospects, Proceedings of the Munich Symposium 10th-14th September 1984, OECD, Paris, 1985, pp. 214-230; Handl, ELQ, Vol. 15, No. 2, 1988, at pp. 242-243.
[123] NEA, Liability and Compensation for Nuclear Damage 1994, at p. 113.
[124] Article I (1) (o) of the Amended Vienna Convention; Article 1 (x) of the Amended Paris Convention.

the competent court to determine the circumstances in which eligible preventive measures for compensation could reasonably be taken. The fact is that the Conventions provide for a general approach to these measures, and leave the competent court to elaborate the relevant criteria for taking reasonable measures. The competent court must therefore take into account all the circumstances, nature, and extent of the damage at the time to determine the "reasonableness" of taking such measures.[125] This should be assessed according to the available facts and in the light of relevant scientific and technical expertise, available when the measures are taken.[126] However, if 'a government or other public body decides to take certain measures, this does not in itself mean that the measures are reasonable for the purpose of the Conventions'.[127] This may give rise to a problem in the case of a claim for compensation for regular expenses which are interrelated with the measures taken to prevent and reduce the harmful consequences of a nuclear accident.[128]

Secondly, any claims for compensation for costs of preventive measures to prevent or to minimize harm to the environment, should be assessed on the basis of objective criteria.[129] The damage caused by the accident must be serious. Consequently, preventive measures taken to prevent insignificant harm to the environment are not covered under the nuclear liability conventions.

Finally, preventive measures must be approved by the competent authorities of the State in accordance with national law, which determines who is entitled to take the measures.[130] Preventive measures taken after a nuclear accident can be taken by any person, the government or private persons.[131] Preventive measures may also be taken by the operator of a nuclear installation, or any other individuals affected by the accident. In principle, preventive measures taken after a nuclear accident are usually taken by the Installation State in whose territory the accident occurred or by the State affected by the nuclear accident to protect its population and the environment. In most cases, the State affected by a nuclear accident is the Installation State, which is therefore obliged to take preventive measures after the accident. This obligation is justified by the fact that it has the right to permit the operation of nu-

[125] Article I (1) (o) of the Amended Vienna Convention; Article 1 (x) of the Amended Paris Convention.
[126] Jacobsson, 2000, at p. 47.
[127] Jacobsson, 2000, at p. 47.
[128] Šoljan, 2000, at p. 81.
[129] Jacobsson, 2000, at p. 47.
[130] Vanda Lamm, "The Reform of the Nuclear Liability Regime", in: AJH, Vol. 40, Nos. 3-4, 2000, pp. 169-194, at p. 178.
[131] NEA/SEN/LEG(90)3

clear installations in its country and at the same time benefit from the nuclear energy that is generated, which allows for development. The affected State is also in the best position to take immediate action to prevent and reduce the harmful consequences caused by a nuclear accident in its territory, i.e., making notification and providing assistance.[132] However, if the affected State is not the Installation State, there is a general obligation upon it to protect its populations and citizens from being exposed to any danger. Accordingly, the State plays a more essential role than individuals in providing preventive measures in case of industrial and natural catastrophes. The role of State intervention in such cases is significant in dealing with the damage caused by the disaster. The State uses all available means to prevent the spread of harmful consequences of the accident, while the capacity of individuals to take such measures at the time of the disaster is usually limited.

The effectiveness of preventive measures taken after a nuclear accident certainly relies on collective efforts made by the affected and non-affected States. It should be noted that before the Chernobyl accident preventive measures were coordinated at national level, according to the national legislation of the State. This was based on a number of recommendations adopted by ICRP, WHO, ILO, and Basic Safety Standards adopted by the IAEA, which were aimed at improving the safety measures of the installations. However, after the Chernobyl accident, this situation changed, as the international measures were taken after a nuclear accident, coordinated in particular by the IAEA and the OECD/NEA, which take a leading role in coordinating and providing assistance to States.[133]

3.4.1.3.3.4 Costs of measures to reinstate the impaired environment

Another positive development in the concept of nuclear damage introduced by the Amended Vienna Convention, the Convention on Supplementary Compensation, and the Amended Paris Convention is covering costs of measures to reinstate the impaired environment after a nuclear accident. Under these Conventions, the concept of reinstatement measures is defined as 'any reasonable measures which have been approved by the competent authorities of the State where the measures were taken, and which aim to reinstate or restore damage or destroyed components of the environment, or to introduce, where reasonable, the equivalent of these components into the environment. The law of the State where the damage is suffered shall determine who is entitled to take such measures'.[134] This provision contains cer-

[132] Hanqin, 2003, at p. 95.
[133] NEA, Liability and Compensation for Nuclear Damage 1994, at p. 115.
[134] Article I (1) (m) of the Amended Vienna Convention; Article I (g) of the Convention on Supplementary Convention and Article 1 (a) (viii) of the Amended Paris Convention.

tain conditions for recovering the costs of reinstatement measures. First, the permission for taking such measures must be approved by the competent authorities of the State. Secondly, the measures should be aimed at the reinstatement and restoration of destroyed components of the environment, and finally the measures must be reasonable.[135]

The above-mentioned instruments cover the costs of reinstatement measures undertaken or to be undertaken, unless the impairment is insignificant.[136] This includes the costs of cleaning-up measures taken to remove contamina-

[135] The basis of the concept of reinstatement measures of the impaired environment is also recognised under other regimes of liability in international and national law. These regimes recognise the liability of the operator of the activity as well as liability of the State to pay the costs of reinstatement measures to be taken to restore the impaired environment to its previous situation. In relation to civil liability, there are several instruments dealing with such liability, such as the 1984 Protocol to Amend the 1969 International Convention on Civil Liability for Oil Pollution Damage, adopted at London on 25 May1984, available at: http://www.ecolex.org/ecolex/ledge/view/RecordDetails?id=TRE-000839&index=treaties (accessed on 13.4.2012). This Protocol includes in the definition of the compensable damage the costs of reinstatement measures undertaken or to be undertaken to restore the impaired environment by oil pollution (Article 1 (6)). A similar provision is also included in the 1993 Lugano Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Article 2 (7) (c)). With regard to the provisions related to the concept of reinstatement under State liability, the 1988 Antarctic Minerals Convention provides for the residual State liability including costs of cleaning up, removal and action taken to restore the impaired environment to the Antarctic environment or dependent or associated ecosystems (Article 8). Moreover, similar situations for compensation of costs of reinstatement of the impaired environment are contained in national law. For instance, under German law of damages, compensation for the damage caused is governed by the principle of restitution. This principle is provided for under section 249 of the German Civil Code. According to this provision, the liable person is obliged first to make restitution by restoring the situation to what it was before causing the damage if possible; otherwise he should make compensation for the damage (Thomas Brinkmann, "International Maritime Law, German Law: Damage to Person, Property and the Environment", in: TMLJ, Vol. 22, 1997-98, pp. 545-567, at p. 546). This means that if restitution in kind is impossible, the liable person should provide compensation for the damage instead. The payment of compensation of costs of restitution under the German law is governed by the cost of restitution of the damage, even if the payment exceeds the value of what was damaged (Brinkmann, TMLJ, Vol. 22, 1997-98, at p. 547). In contrast, the 1990 German Environmental Act provides for compensation of costs of reinstatement measures for the restoration of the impaired environment and stipulates that the value of such costs should not be exceeded by the value of the damaged thing (Brinkmann, TMLJ, Vol. 22, 1997-98, at p. 547).

[136] Article I (1) (k) (iv) of the Amended Vienna Convention, Article I (f) (iv) of the Convention on Supplementary Convention and Article 1 (a) (vii) (4) of the Amended Paris Convention.

tion from the impaired environment, and restoration measures taken after removing the contamination caused by a nuclear accident to eliminate all the contaminated elements introduced into the impaired environment, where it is possible to reinstate the environment to its previous condition, as it was before the accident.[137] For example, this may include cleaning up the site of the installation and the surrounding environment by removing debris, nuclear waste and contaminated objects as a result of a nuclear accident. These must be eliminated to return the contaminated environment to the condition it was in before the accident. However:

> 'It should be underlined that this definition undoubtedly does not introduce the concept of reinstatement of the impaired environment to its pre-existing condition. Namely, the desire to restore the environment to its condition prior to the nuclear incident shall be subject to the rule of reason. The highly complex nature of ecosystems may prevent attempts to achieve a meticulous reinstatement of the environment which in many cases may appear impossible and unreasonable in the technical or economic sense. Specific problems may be the assessment of natural regenerating processes and the necessity of appropriate steps to promote or assist the reinstatement of the damaged environment in its natural recovery'.[138]

Moreover, it was stated that:

> 'Providing a remedy for long-term adverse effects to the environment is more complicated. The meaning of "restoration" in the case of environmental damage carries both subjective judgment and objective evaluation. What is reparable and what is not often goes beyond the liability regime. When a liability regime is designed specially for a common area such as [the] Antarctic, additional monetary compensation, beyond that immediately necessary to repair the damage, may be required for the protection of the environment and its ecosystem on a long-term basis. Even so, it needs to be restricted to a reasonable range for the benefit of the activities in the region'.[139]

Finally, it should be noted that although the nuclear liability conventions stipulate that compensable environmental damage caused by a nuclear accident should be significant, these conventions provide no criterion to determine what is considered "significant" or "insignificant" harm, or to distinguish between the two levels of damage. This has clearly been left to be decided by the competent courts, according to the scientific standards established by national law. In that case, the measures to reinstate the impaired environment that have actually been undertaken or are to be undertaken will

[137] Šoljan, 2000, at p. 74; Hanqin, 2003, at p. 252.
[138] Šoljan, 2000, at p. 77-78.
[139] Hanqin, 2003, at p. 257.

open up the way for further costs, even if these uncertain costs are not covered.[140] The instruments also cover the costs of reinstatement measures, if such measures are reasonable. This means that the measures taken should be necessary and appropriate for restoring the environment to its previous condition. This must be assessed on the basis of the available scientific and technical standards at the time that the measures are taken.[141]

3.4.1.3.3.5 Economic damage

The idea of covering the economic loss suffered by victims of a nuclear accident in the nuclear liability conventions is not new. It was proposed during the negotiations in the Conference which adopted the Vienna Convention in 1963. However, it was rejected due to the differences of opinion of the Contracting Parties.[142] Economic loss is also recognized by many civil liability regimes of tort law.[143] Most legal systems allow compensation for loss of

[140] Rosas, NJIL, 1991, Vol. 60, Issue 1/2, at p. 41.

[141] Šoljan, 2000, at p. 81.

[142] During the 1963 International Conference and the negotiations of the Vienna Convention, the US delegation had proposed that the Convention should contain an express provision to preclude the liability of the operator for economic loss and damage caused by a nuclear accident. According to that proposal, 'if certain damage arising out of a nuclear incident, such as loss of profits, mental suffering and moral damage, was not regarded as falling within the definition of nuclear damage and, further, a Contracting Party did not bring such damage within the scope of the Convention by virtue of the operational power […in Article I .1. (k)(ii)], a strong argument could be made to the effect that what the Convention did not deal with, it did not control, and that recovery for such damage could therefore be permitted under normal tort law outside the Convention. That would clearly be inconsistent with the objectives of the Convention, as the operator and other parties involved would then be subject to liability for damage arising from a nuclear incident without the benefit of the provisions of the Convention dealing with limit of liability, channelling, etc'. IAEA, "Civil Liability for Nuclear Damage: Official Records", International Conference held by the IAEA, Vienna, 29 April-19 May 1963, IAEA, Legal Series No. 2, Vienna 1964, at p. 175.

[143] For reference to economic loss in general, A. M. Honoré, "Causation and Remoteness of Damage", in: IECL, Vol. XI, Part I, Torts, Chapter 7, 1983, pp. 1-154; William Tetley, "Damages and Economic Loss in Maritime Collision: Controlling the Floodgates", in: JMLC, Vol. 22, No. 3, 1991, pp. 539-585; Efstathios K. Banakas, (ed.), "Civil Liability for Pure Economic Loss", Proceedings of the Annual International Colloquim of the United Kingdom National Committee of Comparative Law held in Norwich, September 1994, Kluwer International Law, London-The Hague-Boston, 1996; Norbert Trotz, "Report of the Chairman of the International Sub-Committee: Admissibility and Assessment of Claims for Pollution Damage", IMCY, 1993, Sydney I, Documents for the Conference, pp. 88-139; Måns Jacobsson, "The International Conventions of Liability and Compensation for Oil Pollution Damage and the Activity of the International Oil Pollution Compensation Fund", in: Collin M. de la Rue (ed.), Liability for Damage to the

profit or earnings caused as a result of damage to property and personal injury. Reference should be made to the fact that the concept of economic loss in the civil law systems is different from the concept of economic loss in the common law system. Civil law systems cover economic loss resulting from material and immaterial damage caused to property, while the common law systems distinguish between consequential damage and pure economic loss. According to the theory and jurisprudence of common law, compensation cannot be made for pure economic loss.[144]

Therefore, it is not surprising that the concept of economic loss, as an element in nuclear damage caused by a nuclear accident, was adopted in the Amended nuclear liability conventions.[145] However, the Amended Vienna Convention did not establish any basic guidelines to determine the scope and extent of economic loss to be compensated.[146] Under this Convention, economic loss can be divided into three categories: the first is economic loss and damage caused as a result of loss of life, personal injury, and damage to property, which may result, for example, in a loss of earnings.[147] This can also include economic loss caused as a result of an embargo on agricultural or animal products, or any other loss of production as a result of exposure to radiation caused by a nuclear accident. Moreover, it includes trade between States affected by the embargo because of the products contaminated by a nuclear accident, as well as business and economic activities of people and States.

The second category is economic loss caused to environmental amenities. It covers economic interests which are adversely affected by loss of income from any use or enjoyment of the environment, where the damage caused to the environment is significant and is not covered by the category of economic loss to property.[148] For example, the owner of an hotel who has suf-

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Maritime Environment, Lloyd's of London Press Ltd., London, New York, Hamburg, Hong Kong, 1993, pp. 39-55; Efstathios K. Banakas, "Civil Liability for Pure Economic Loss", in: UK Law for the Millennium, a collection of reports delivered at the XVth International Congress of Comparative Law held in Bristol, United Kingdom, July 1998, United Kingdom National Committee of Comparative Law in association with the British Institute of International and Comparative Law, 1998, pp. 1-42; Thanassis Liakopoulos and Georgios Mentis, "Civil Liability for Pure Economic Loss in Greece", in: RHDDI, Vol. 51, Issue 1, 1998, pp. 61-69.

[144] Šoljan, 2000, at p. 67

[145] Article I (k) (iii) of the Amended Vienna Convention and Article 1 (a) (vii) (3) of the Amended Paris Convention; also see Layard, RECIEL, Vol. 5, Issue 3, 1996, at p. 220.

[146] Šoljan, 2000, at p. 67.

[147] IAEA, INLEX, 2004, at p. 38.

[148] Article I (1) (k) (v) of the Amended Vienna Convention; Article 1 (vii) (5) of the Amended Paris Convention.

fered economic loss as a result of a lack of customers because of the environment is contaminated by a nuclear accident[149] is entitled to compensation for this damage,[150] even if he has not suffered personal or property damage.[151] This applies provided that the victim relies for his income on the use of the polluted area which is badly contaminated and the profits from his activities have been reduced.[152] Nevertheless, this provision seems contradictory. It allows compensation for economic interests related to any use or enjoyment of the environment, and at the same time it stipulates that the impairment of the environment must be significant. At the same time, the term "any enjoyment" means any reduction in the benefit from the use of the environment which can cause economic damage without causing any significant impairment to the environment. Hence, victims of a nuclear accident should be compensated if their use or enjoyment of the environment is adversely affected, even if the impairment to the environment and economic interest from such use or enjoyment is insignificant.

The third category covers any other economic loss. Under the Amended Vienna Convention, the concept of nuclear damage is extended to cover any economic loss other than damage caused as a result of the impaired environment, if this is permitted under the general law of civil liability of the competent court.[153] Hence, compensation for this type of damage depends on whether or not there is a provision covering such damage under national law.[154] In contrast, the Amended Paris Convention does not include other economic loss in the definition of nuclear damage. Consequently, the operator of a nuclear installation is not liable under the Paris Convention for any other damage caused by a nuclear accident, as long as there is no provision under the Convention to cover such damage. This leads to discrimination between victims of nuclear damage when the victims are citizens of a Contracting Party to the Paris Convention or to the Vienna Convention, when the 1988 Joint Protocol is applicable. The acceptability of claims under this category of economic loss has been left to be decided by the competent court

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[149] Barboza, 1998), at p. 97.

[150] For the economic damage see, NEA Secretariat, NLB, No. 39, 1987, pp. 58-65.

[151] Johan G. Lammers, "International Responsibility and Liability for Damage Caused by Environmental Interferences", in: EPL, Vol. 31/1, pp. 43-50 and Vol. 31/2, pp. 94-105, 2001, at 97; Lammers, HYIL, Vol. 16, 2003, at p. 53.

[152] H. Rustand, "Updating the Concept of Damage, Particularly as Regards Environmental Damage and Preventive Measures, in the Context of the Ongoing Negotiations on the Revision of the Vienna Convention-Some Comparative Aspects", in: OECD/NEA and IAEA, 1993, pp. 218-238, at p. 233.

[153] Article I (1) (k) (vii) of the Amended Vienna Convention.

[154] IAEA, INLEX, 2004, at p. 39.

in accordance with the general law of civil liability. Therefore in practice, even if economic loss, as an element of nuclear damage, has been included in an international convention, the interpretation of the nature and extent of such damage should be decided by the competent court. However, this will be assessed in each individual case according to criteria established by the court, which determines the reasonable compensation for loss of income caused to victims of a nuclear accident.[155]

Economic loss suffered by victims of a nuclear accident is usually indirect damage or loss caused to the victims of the accident. It is a secondary damage, which should only be compensated after the compensation for the nuclear damage caused by the nuclear accident, when they are associated. In most cases, economic loss is a result of nuclear damage caused to persons, property or the environment, or any other associated damage. It was argued that:

> 'As a general rule it would seem that domestic third party liability laws envisage compensation for economic loss flowing from personal or property damage as part of the compensation to be ordered for that personal or property damage. Where, however, a person suffers economic loss without suffering personal or property damage the courts of some States at least seem to hesitate to order compensation'.[156]

The US courts awarded compensation for economic loss caused by the Three Mile Island accident, only in the case of physical or property damage caused by the accident.[157]

Economic loss or damage caused by a nuclear accident usually results from direct nuclear damage caused by it to individuals or to the State. It covers damage to persons, property or the environment, or other economic loss deemed to be such by the competent court in accordance with the rules of national or international law, depending on the case where it is presented. It usually covers damage or loss of profit or earnings for persons, damage to property and the environment per se, or any other indirect damage resulting from a nuclear accident. For example, the owner or the user of a contaminated property, or of a particular place in the environment, may suffer economic loss as a result of the accident, but such damage cannot be compensated, unless the original damage (property or environmental damage) was compensated. The concept of nuclear damage under the nuclear liability conventions covers economic loss caused as a result of products being contaminated by ionising radiation above the permitted levels of radioactivity.

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[155] Rustand, 1993, at p. 233.
[156] Rustand, 1993, at p. 232.
[157] Layard, RECIEL, Vol. 5, Issue 3, 1996, at p. 220.

Thus economic loss resulting from indirect damage caused by a nuclear accident, or economic loss caused as a result of property being contaminated by radioactivity under the permitted level of radioactivity, is excluded.[158] This is because the original damage covered by the nuclear liability conventions is excluded. This has been left to be assessed and decided by the competent court. In addition, to prove economic loss, there must be a comprehensive assessment of all the elements of nuclear damage suffered by the victims of the accident. This must be done by experts after the accident and it may take several years. It is a difficult task, because all the elements of economic loss must be assessed in each individual case. The competent court decides whether or not the economic loss caused by a nuclear accident can be compensated on the basis of this assessment.

The costs of evacuating people from the contaminated environment after a nuclear accident and renting houses for the refugees are also an urgent problem. This must be taken into account in the assessment of the economic loss and damage to the environment. The costs of evacuation have to be paid to the victims while they have to leave their homes until they can return when the situation is safe. The victims are also entitled to receive living expenses if they suffer loss of earnings during the time of evacuation.[159]

Furthermore, with regard to pecuniary and evacuation losses caused by a nuclear accident, it is useful to refer to the Report of the Presidential Commission on Catastrophic Nuclear Accidents to the US Congress, which was published in 1990. This Report provides a detailed illustration of the scope of pecuniary loss caused by a nuclear accident. In this Report, the Commission suggested a very broad interpretation of the recoverable nuclear damage caused by a nuclear accident. In the Report the Commission proposed three categories of recommendations for recovering the pecuniary damage caused by a nuclear accident. The first category of recommendations concerns the recoverable nuclear damage for individuals. It includes costs associated with evacuation, decontamination, resettlement and emotional distress. The second category of recommendations concerns losses incurred by farms and businesses as a result of temporary evacuation costs, permanent abandonment, decontamination costs and loss due to the reduction in value of property, the relocation of the business, etc. The final category relates to loss and damage caused to the Federal State and local authorities. This category concerns financial expenditure, such as the cost of emergency response efforts, damage to public land, buildings, railways, water supply facilities, loss of

[158] Abd Elhameed Osman Mohamed, "Civil Liability for Damage Caused by Radioactivity", (Arabic edition) Cairo University 1993, at pp. 384-385.
[159] Ham, Yim and Kim, 1998, at p. 494.

revenue from income, sales and other taxes, loss of revenue as a result of a reduction in the housing stock, decontamination of public land, quarantine, etc.[160]

Finally, the pure economic loss caused by a nuclear accident is another issue related to this category of economic loss. Pure economic loss is usually suffered by victims of a nuclear accident where there is no material damage.[161] Compensation of economic loss may give rise to certain difficulties if the nuclear accident caused only economic loss, without causing any material nuclear damage. According to the Amended Vienna Convention, the applicable law of the competent court must decide on compensation for pure economic loss, which may be covered by the category of other economic loss.

3.4.2 Legal damage and transboundary environmental consequences

As noted above, the debate on the element of damage as a constituent element in international liability does not arise in the case of environmental nuclear damage caused by nuclear activity as a lawful activity. This is because damage is an essential element in the liability for environmental damage caused by nuclear activities. The liability applies to the operator of a nuclear installation or to the State where actual environmental nuclear damage is caused by a nuclear accident. This is an essential condition for risk liability for damage caused by hazardous activities when the damage is caused without any violation of the rules of international law. However, in some cases, damage is associated with a State's violation of its obligations under international law or the State has violated its environmental and nuclear obligations without causing physical environmental damage. The matter becomes controversial and difficult when there is no material damage, although international rules and standards have been violated. This means that the State is responsible for its wrongful acts, but the element of damage has to be identified. This raises the question of what damage is meant in the State's liability for a wrongful act, and whether or not it is a necessary element in the liability.

The importance of this question lies in the fact that as we will see later, international law imposes certain international obligations upon States to prevent, reduce and remedy damage caused by hazardous activities. The implementation of these obligations is significant in preventing environmental

[160] Presidential Commission on Catastrophic Nuclear Accidents, Vol. one, August 1990, at pp. 76-78.
[161] NEA/LEG/DOC (89)4, at p. 1.

damage caused by nuclear activities. The violation of these obligations may incur State liability even if no environmental damage is caused by the nuclear activities. This was emphasized in the 2006 Draft principles on the allocation of loss, which states that 'States are responsible for infringements of their obligations of prevention under international law'.[162]

The element of damage was debated by the ILC during the codification of the Draft Articles on State responsibility.[163] However, from the start the ILC did not consider that it was a constitutive element for State responsibility for its wrongful acts. This was indicated by the Special Rapporteur Ago in his second report to the ILC.[164] In his third report, Ago argued that 'under international law an injury, material or moral, is necessarily inherent in every violation of an international subjective right of a State'.[165] This approach was also supported by the States in the Sixth Committee of the UN General Assembly during the debate on the issues of State responsibility. For example, the Netherlands Government that:

> 'The Netherlands Government also agrees with the Commission's decision not to make damage a constitutive element of a wrongful act. This decision ensues, indeed, from the structure of the draft; whether or not damage is required is a matter of primary rules. The Commission's decision is also correct from another point of view: a State could have a legitimate interest in the fulfilment of an international obligation which has been breached in a specific case even though it has suffered no damage'.[166]

Accordingly, the ILC Draft Articles on State responsibility do not include damage among the main elements constituting a State's liability for a wrongful act. According to Article 2 of these Articles, '[t]here is an international wrongful act of a State when conduct consisting of an action or omission: (a) Is attributable to the State under international law; and (b) Constitutes a breach of an international obligation of the State'. These are two main elements necessary for State responsibility for wrongful acts. The first element is a subjective element, while the second element is objective.[167] This provision does not refer to the element of damage as a third constitutive element

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[162] See, the Preamble of the Draft principles on the allocation in the case of transboundary harm arising out of hazardous activities, with commentaries in 2006, and submitted to the General Assembly (A/61/10).
[163] YILC, 1973, Vol. II, at p. 183, para. 12.
[164] YILC, 1970, Vol. II, Doc. A/CN.4/233, at p. 194, para. 53.
[165] YILC, 1971, Vol. II, Part One, at p. 223, para. 74.
[166] YILC, 1980, Vol. II, Part One, at p. 102, para. 4.
[167] YILC, 1970, Vol. II, Doc. A/CN.4/233, at p. 187, para. 31; YILC, 1973, Vol. II, at p. 183, para. 12.

of State responsibility for its wrongful acts and its relationship with international liability.

Damage as an element in State responsibility for a wrongful act was also a controversial matter in international case law. In its judgment in the Phosphates in Morocco Case the PCIJ stated that, '[t]his act being attributable to the State and described as contrary to the treaty right of another State, international responsibility would be established immediately as between the two States'.[168] However, in the decision of the General Claims Commission in the case of the Dickson Car Wheel Company (U.S.A.) v. United Mexican States of July 1931, the Commission considered that the existence of the element of damage is necessary to establish the liability of the State. It stated that:

> 'It is indispensable therefore, in order that a claim may prosper before this Commission, that two elements coexist: an unlawful international act and a loss or injury suffered by a national of the claimant Government. The lack of either of these two elements must necessarily be fatal to any claim filed with this Commission'.[169]

The doctrine of international law also deviates from this by accepting damage as a constitutive element in State responsibility for wrongful acts. Some authors consider it a necessary element in the liability,[170] as they consider that in international law damage is a breach of a right or legal interest of a State as one of the subjects of international law.[171] The damage is inherent in international obligations and 'only a condition for the existence of the objective elements of the violation'[172] and not a constitutive element in the liability for a wrongful act.[173] They consider that the violation of international obligations erodes the rights of other States and view it as legal damage which is an introduction and source of State responsibility in international law only in the case of a violation of a legal right.[174] They assume that any violation of an

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[168] Phosphates in Morocco case (Preliminary Objections), Between the Government of the Kingdom of Italy and the Government of the French Republic, Judgment of 14 June 1938, PCIJ, Series A/B, No. 74, 1938, at p. 28.
[169] RIAA, Vol. IV, pp. 669-691, at p. 678.
[170] Clyde Eagleton, "The Responsibility of State in International Law", New York University Press, Washington Square, New York, 1928, at p. 22.
[171] Mohamed Hafez Ghanem, "International Responsibility", (Arabic Edition) Cairo, 1962, at p. 113.
[172] YBIL, 1973, Vol. II, at p. 183, para. 12, footnote.
[173] YILC, 1970, Vol. II, p. 195, paras. 53 and 54; B. Graefrath, "New Trends in State Responsibility", in: Responsibility of States, published by the Institute of Public International Law and International Relations of Thessaloniki "Peace Messenger of the U.N." (A/42/487), Thessaloniki, Thesaurus Acroasium, Vol. XX, 1993, pp. 105-169, at p. 115.
[174] Tanzi, 1987, at p. 12.

international obligation imposed upon one State adversely affects the subjective right of another.[175] Therefore, if an international wrongful act is committed by one State directly against another State, it is not necessary for the injured State to prove that it has suffered actual damage. The illegal act is in itself sufficient to constitute a legal interest.[176] Preserving this legal interest in the field of international relations is more important than the economic interest or material damage. As Garcia Amador said:

> '[I]n international relations political and moral considerations are of special importance, generally carrying more weight than economic or other considerations or interests. In fact, economic considerations often play a secondary part, being in a way subordinate to such political and moral considerations as the "honour and dignity of the State" which has been wronged, either directly or in the person of one of its nationals'.[177]

This is because there are no inherent limits on the concept of legal interests, as compared to material interests.[178] Furthermore, 'there is no [violation of a] right without a remedy'.[179] Thus the breach of a right of a State by another State entails a remedy.

The concept of legal damage is also expressed by the concept of immaterial damage or moral damage. In addition to its relation to a violation of international obligations, '[n]on-material damage is generally understood to encompass loss of loved ones, pain and suffering as well as the affront to sensibilities associated with an intrusion on the person, home and private life'.[180] International case law recognizes moral damage being eligible for compensation. In 1923, the Tribunal decided to award compensation for material and moral damage in the case between the United States of America and Germany for damage caused to the American citizens who were on board the UK Ship Lusitania, which was attacked by a German submarine off the coast of Ireland on 7 May 1915. There were 197 American citizens

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[175] Tanzi, 1987, at p. 13.
[176] Georg Schwarzenberger, "A Manual of International Law", Fifth Edition, Stevens & Sons Limited, London, 1967, at p. 175.
[177] García-Amador, RDC, Vol. 94, Part II, 1958, at p. 481.
[178] Tanzi, 1987, at p. 14.
[179] R. Van Alebeek, "The Immunity of States and Their Officials in the Light of International Criminal Law and International Human Rights Law", PhD thesis, Leiden University, Series of the E. M. Meijers Institute of Legal Studies of Leiden University, 2006, at p. 410.
[180] James Crawford, "The International Law Commission's Articles on State Responsibility: Introduction, Text and Commentaries", Cambridge University Press, UK, New York, 2002, at p. 223.

on board the ship, and 128 perished.[181] The Tribunal stated in its decision on compensation for moral damage suffered by the victims: 'Mental suffering is a fact just as real as physical suffering, and susceptible of measurement by the same standards'.[182] It also stated that '[m]ental suffering to form a basis of recovery must be real and actual, rather than purely sentimental and vague'.[183] The Tribunal took into account the mental suffering and shock caused by the many deaths of family members in the sinking of the Lusitania.[184] The Tribunal considered:

> '[T]hat under the rules of international law, the injured party is 'entitled to be compensated for an injury [...] resulting in mental suffering, injury to his feelings, humiliation, shame, degradation, loss of social position or injury to his credit or to his reputation. [T]here can be no doubt [about this, and the] compensation should be commensurate [... with] the injury. Such damages are very real, and the mere fact that they are difficult to measure or estimate [... in monetary terms does not make them any] less real and affords no reason why the injured person should not be compensated...'[185]

This was also the view of the PCIJ in the case concerning the interpretation of paragraph 4 of the Annex to Article 179 of the Treaty of Neuilly between the Government of Bulgaria and the Government of Greece.[186] In its judgment, the Court stated that the last sentence of the Treaty of Neuilly should be interpreted as authorizing claims in respect of damage incurred by claimants not only as regards their property and interests but also as regards their person by reason of ill treatment, deportation, internment.[187]

According to these judgments, moral damage can be compensated, but only when it is real damage suffered by persons. However, as regards moral damage suffered by States, the view was that this cannot be compensated. In the Trail Smelter Case: '[I]n its decision of 1938, the Tribunal rejected the claim of the United States for 'damages in respect of the wrong done the United States in violation of sovereignty'.[188] It stated that, '[t]he Tribunal is,

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[181] Opinion in Lusitania Cases, November 1, 1923, RIAA, Vol. VII, pp. 32-44, at p. 33.
[182] RIAA, Vol. VII, at p. 36.
[183] RIAA, Vol. VII, at p. 37.
[184] Pontavice, 1977, at p. 452.
[185] RIAA, Vol. VII, at p. 40.
[186] Permanent Court of International Justice, Interpretation of Paragraph 4 of the Annex Following Article 179 of the Treaty of Neuilly, Between the Government of His Majesty the King Bulgars and the Government of Greece Republic, On March 26th 1925, PCIJ Reports, Series A-No.3, 1925, Article 179, Annex, Paragraph 4, (interpretation), at p. 5.
[187] PCIJ Reports, Series A-No.3, 1925, at p. 9.
[188] Trail Smelter Case (United States, Canada), 16 April 1938 and 11 March 1941, RIAA, Vol. III, pp. 1905-1982, at p. 1932.

therefore, of opinion that neither as a separable item of damage nor as an incident to other damages should any award be made for that which the United States terms "violation of sovereignty".'[189] According to Handl, 'a claim for moral damages might have been disallowed in this case of transnational air pollution'.[190] However, such damage is subject to agreement between States.[191] Thus actual moral damage is not considered a constituent element in responsibility for a wrongful act. There is no evidence to compensate such damage in international case law, because agreement itself is one of the legal consequences of the responsibility of a State for a wrongful act.

Liability is always based on damage, and in the absence of damage responsibility cannot be attributed to a State. However, due to the different nature of State responsibility for wrongful acts from its liability for lawful acts, the liability for lawful acts is based only on actual material damage or moral damage, while responsibility for wrongful acts is based on legal damage or moral damage resulting from the destruction of one State's legal right by another State. Every State has a legal right to preserve its sovereign dignity and this may not be violated by another State. This right was upheld by the ICJ in the Case Concerning the Barcelona Traction, Light and Power Company, Limited, Judgment of 5 February 1970. The Court stated that 'all States have a legal interest in its observance. In order to bring a claim in respect of the breach of such an obligation, a State must first establish its right to do so, for the rules on the subject rest on two suppositions'.[192]

Moreover, if that right has not been respected, there is imminent danger of causing material damage in some cases. This applies particularly with regard to international obligations governing hazardous activities. As mentioned above, international law imposes certain obligations upon the State to prevent, reduce and repair the incidence of environmental damage caused by nuclear activities. If these obligations are breached, this can lead to transboundary nuclear damage caused by nuclear activity. As mentioned above, the USSR attributed the Chernobyl accident to the operating personnel and to negligence with regard to implementing nuclear safety regulations. In fact, the accident occurred as a result of a lack of supervision by the USSR authorities to enforce international obligations related to nuclear safety in nuclear installations. In addition, the liability of a State for environmental damage caused by nuclear activities applies when actual damage is caused by the

[189] The Trail Smelter Case, RIAA, Vol. III, at p. 1933.
[190] Handl, AJIL, Vol. 69, No. 1, 1975, at p. 63.
[191] Hashim, 1991, at p. 340.
[192] ICJ Reports, 1970, p. 3, at p. 32, para. 35.

activity and this damage must be compensated, while a State is responsible for wrongful acts, even if there is no actual damage, and must correct the situation before breaching an international obligation.[193] As Graefrath observed:

> '[T]here is no reason at all to ignore the difference between international responsibility and liability by summarizing both as "forms" of responsibility. The aim of one rule is to guarantee an international obligation and, the aim of the other is limited to an allocation of damages that, taking into consideration and balancing the different interests, has to be specifically agreed upon. Both methods aim, in very different ways, at guaranteeing peaceful international cooperation. International responsibility arises with the violation of an international obligation whether or not material damage occurred. Not all damage entails liability but there is no liability without damage. The allocation of damage is the essential purpose of liability agreements concerning lawful activities and that can be accomplished by very different means and methods'.[194]

3.5 Conditions of compensable nuclear damage

Certain conditions must be met for compensation to be made for environmental nuclear damage caused by a major nuclear accident. These include: (1) the occurrence of a nuclear accident or the existence of a nuclear activity; (2) the fact that actual environmental nuclear damage is caused by the activity; (3) a causal link between the damage and the accident or the activity; (4) the damage must be significant; and (5) and no previous compensation was made.[195]

3.5.1 A nuclear accident or nuclear activity

The first condition that must be met for compensation for environmental nuclear damage is the existence of a nuclear activity as defined in international law. However, it is important to emphasise that not every nuclear installation can be considered to be a nuclear installation. The concepts of a nuclear installation as well as nuclear activity are taken from the list of definitions of a nuclear installation in the applicable nuclear liability convention.[196] The reason for imposing this condition is that the extent of the operator's liability under the nuclear liability conventions is limited to each nuclear accident. In

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[193] YILC, 1987, Vol. II, Part Two, at p. 43, para. 146.
[194] Graefrath, RDC, Vol. 185, Part II, 1984, pp. 9-150, at p. 107.
[195] El Shaaraoui, 1992, at p. 51; Oscar Schachter, "International Law in Theory and Practice", Martinus Nijhoff Publishers: Dordrecht/Boston/London, 1991, at p. 366.
[196] Article 1 (a) (ii) of the Paris Convention; Article I (j) of the Vienna Convention.

addition, the limited amount of radioactivity resulting from a nuclear event which cannot be considered a nuclear accident cannot give rise to international liability. Hence, if nuclear damage is caused by a nuclear activity, but the concept of the nuclear accident or nuclear activity cannot be identified according to the terms of the applicable nuclear liability convention, it cannot be compensated, unless it is covered by national legislation or by another international instrument. Normally, low levels of radioactivity caused by a nuclear activity have only a limited impact on the worker and the surrounding environment inside the installation. Therefore, under the nuclear liability conventions, such damage is covered by the ordinary national liability regime.[197] However, the above-mentioned condition does not apply in the case of State responsibility for wrongful acts. In the case of a violation of an international obligation, the State is responsible, even if there is no accident and no material damage has taken place. Thus the definition of the notion of a nuclear installation and the notion of a nuclear accident is a significant issue in limiting or expanding the liability for nuclear damage under the nuclear liability conventions. However, it should indicate which is the more relevant as a criterion for determining the liability. Deciding on an effective standard of liability is important to determine the amount of compensation payable to victims of nuclear damage under the nuclear liability conventions. An effective standard of liability determines whether or not the victims will be fully or partially compensated, or not receive any compensation at all. Therefore, establishing a criterion to determine the amount of the operator's liability was one of the primary concerns of the drafters of the nuclear liability conventions. There were some differences of opinion among the Contracting Parties and in the doctrine of nuclear liability law in particular regarding a relevant standard of liability. There were two different approaches; the first was that liability for nuclear damage would be limited to each nuclear accident, while the second was that the operator's liability should be determined on the basis of each nuclear installation. Both approaches insist that their standard is in the interests of the victims of a nuclear accident, the operator of a nuclear installation, the insurance companies and the protection of the nuclear industry.

3.5.1.1 A nuclear accident as a criterion of liability

Although victims of environmental nuclear damage should be compensated whether compensation is provided per nuclear accident or on the basis of the installation, the nuclear liability conventions and the national nuclear liability legislation of both Contracting and non-Contracting Parties have taken

[197] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 27.

the nuclear accident as the standard to determine the extent of the liability for nuclear damage.[198] The liability of the operator of a nuclear installation for nuclear damage was based on each individual nuclear accident.[199] Damage caused by a nuclear accident to people and the environment must be compensated within the limited liability determined under the applicable convention for each nuclear accident. When this has been exhausted, the operator of a nuclear installation is no longer obliged to compensate nuclear damage, even if some victims have not yet been compensated.

In support of this approach, it was argued that there are certain reasons to justify the limitation of liability for nuclear damage on the basis of each individual nuclear accident.[200] First, the limitation of liability for every nuclear accident provides the victims with the required financial protection. This is because they have the right to submit their claims for compensation from the operator on this basis of the nuclear accident concerned.[201] Secondly, the limitation of liability to each nuclear accident is a precise standard of liability for determining the amounts of compensation and a prescribed period which expires after a certain length of time.[202] This is because the extent of liability for a nuclear accident is known in advance, and the date of the nuclear accident and the applicable period are also known. Thirdly, it may be difficult to determine which nuclear installation caused the damage, if a series of accidents occurred in a number of nuclear installations on the same site. Consequently, it may be difficult to determine which financial cover applies for the damage if the installations are operated by different operators. According to the 1963 IAEA Official Records of the International Confer-

[198] Article V (1) of the Vienna Convention; Article 7 of the Paris Convention; Article III (1) of the Brussels Nuclear Ships Convention; Article 7 of the Amended Paris Convention; Article V (1) of the Amended Vienna Convention.

[199] Nuclear Energy Agency, Not by the Secretariat, Group of Governmental Experts on Third Party Liability in the Filed by Nuclear Energy: Consideration of a Liability and Compensation Regime with Regard to the Disposal of Radioactive Waste, NEA Doc. EN/S1555, Paris 7th July 1993, para. 31, at p. 7; Nuclear Energy Agency, Group of Governmental Experts on Third Party in the Field of Nuclear Energy, "Definition of 'Nuclear Incident' in the Paris Convention: Coverage of Normal, Lawful Release of Radiation Which Cause Damage", Not by the Secretariat, NEA/LEG/DOC(94)3, para. 6, at p. 2.

[200] Geoffrey C. Warren, "Nuclear Damage Under the 1997 Protocol: Conventional Thinking?" in: OECD/NEA and IAEA, Reform of Civil Nuclear Liability, OECD Paris 2000, pp. 85-97, 2000, at p. 90.

[201] Boyle, BYIL, Vol. 60, 1989, at p. 305.

[202] Questionnaire on Application of the Paris Convention to the Long-Term Management of Radioactive Waste, OECD/NEA, Paris: November 21, 1995. Examined by the NEA Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy at their meeting in September 13-15, 1995, at p. 5.

ence on Civil Liability for Nuclear Damage which adopted the Vienna Convention:

> 'The limitation of the operator's liability in amount may be set on a "per incident" or "per installation" basis. If under a pure per installation system several nuclear incidents occur in one nuclear installation, the first incident may absorb all or a great part of the limited liability fund. Although a series of incidents occurring in the same installation may be considered rather hypothetical, injured parties of later incidents might be left uncompensated. In the case of nuclear consignments such an eventuality is not so unlikely. On the other hand, a "per incident" system always assures a certain minimum liability regardless of the number of incidents'.[203]

Finally, determining liability on the basis of a nuclear installation may bankrupt insurance companies because liability will be unlimited, and therefore the operator will fail to fulfil his financial obligations.[204] Insurance companies refuse to insure the nuclear industry where the liability of the operator is not transparent and not known in advance. They are afraid that a single nuclear accident, like the Chernobyl accident, could put the insurance industry at risk.[205] This will certainly be an obstacle to the development of the nuclear industry.[206]

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[203] IAEA, Legal Series No. 2, 1964, at p. 79, para. 64.

[204] Pelzer, 1994, at p. 278; Exposé des Motifs of the Paris Convention, Para. 45; Marie-Claire Camier, "Liability and Insurance of the Atomic Risk in the European Law Systems", Washington 1962, at p. 63; IAEA, "The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage", Explanatory Texts, A Comprehensive study of the Agency's nuclear liability regime by the IAEA International Expert Group on Nuclear Liability (INLEX) to aid the understanding and authoritative interpretation of that regime, Vienna July 2004, Board of Governors and General Conference Doc. GOV/INF/2004-GC(48)INF/5, at p. 47. This study is available at: http:www.iaea.org/About/Policy/GC/GC48/Documents/gc48inf-5explanatorytexts.pdf. This study is reproduced in IAEA International Law Series, No. 3, 2007, IAEA Vienna 2007, at p. 46, also available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1279_web.pdf (accessed on 24.9.2011).

[205] Geoffrey C. Warren, "Compensation for Nuclear Damage: The Balance between the Needs of Society and the Rights of Individual", in: Pelzer (ed.), 1999, pp. 263-270, at p. 264.

[206] IAEA, Legal Series No. 2, 1964, at p. 78; Exposé des Motifs of the Paris Convention, para. 43; Norbert Pelzer, "Focus on the Future of Nuclear Liability Law", in: OECD/NEA and IAEA, 2000, pp. 421-451, at p. 431; J. P. H. Trevor, "Principles of Civil Liability for Nuclear Damage", in: IAEA, Nuclear Law for A Developing World, IAEA Legal Series, No. 5, IAEA Vienna, 1969, pp. 109-115, 1969, at p. 112; Warren, 1999, at p. 270.

3.5.1.2 A nuclear installation as a criterion of liability

In support of this approach, it was argued that limiting the operator's liability on a "per nuclear installation" basis is a practical standard for determining his liability. A nuclear accident as a standard of liability is too vague and ambiguous to enable the competent authorities to determine who is liable for nuclear damage, unless the liable person is engaged in pursuing a nuclear activity (nuclear installation).[207] The nuclear liability conventions are not applicable to nuclear damage unless a nuclear accident has occurred in a nuclear installation. Limiting liability per nuclear installation provides victims of nuclear damage with financial protection. It guarantees them compensation in cases that the period provided for under the applicable nuclear liability convention has expired.[208] In addition, the concept of a nuclear accident is not easy to define if there is a series of events, or in the case of the gradual emission of radiation from a nuclear installation during the normal course of operation, or during the disposal of radioactive waste. In such cases, it is difficult to determine the factors which contributed to causing the nuclear accident, or the exact time and date of the accident, as well as the cause of the damage where nuclear contamination was caused by constant emissions from a nuclear installation or in the case of leakages of radioactivity.[209] There are certain direct and indirect factors which may contribute to causing a nuclear accident. A nuclear accident may occur as a result of a mechanical failure in the plant, or be caused by a hurricane, or any other unknown reason, including geographical or atmospheric factors such as atmospheric pressure. If a nuclear accident occurs during the normal course of operation of a nuclear power plant during a tropical typhoon or hurricane, it can be difficult to determine its exact cause.[210]

In fact, it is not easy to determine the extent of liability that is required for environmental nuclear damage where liability is on a "per nuclear accident" basis. This is mainly due to the fact that nuclear energy involves hazards and has special characteristics. Nuclear risks are not visible to the human eye. Nuclear radiation cannot be perceived by the human senses, it cannot be felt, smelled, tasted, heard, touched or seen. Furthermore, nuclear radiation may cause immediate damage to human cells, but in most cases this only becomes apparent a long time after the nuclear incident. It can also affect future generations. Nuclear radiation does not respect the geographical and political boundaries of States. It can spread from the country of origin of

[207] Mohamed, 1993, at p. 578.
[208] Mohamed, 1993, at p. 580.
[209] Camier, 1962, at p. 64.
[210] Mohamed, 1993, at p. 578.

the nuclear accident, causing nuclear damage to other countries and the global environment. This may cause contamination in the food chain, animals, planets and water or may affect all human life.[211] In these cases, the operator can avoid liability if the nuclear accident was used as the standard to determine liability for nuclear damage. The concept of a nuclear accident cannot be clearly defined in the case of nuclear damage caused by the gradual emission of radioactivity. In addition, it is difficult to determine the starting date of the applicable period, and the operator is not liable for the damage which becomes apparent after that period. In such cases, the concept of a nuclear accident does not apply as the standard for the gradual release of radioactive emissions. Therefore the standards for a "nuclear installation" should apply when the causal link between the nuclear damage and the installation has been proved. The authors of the nuclear liability conventions were aware of this from the start of the regime. According to Paragraph 4 of the Conclusions of the Third Session of the preparatory work for the Paris Convention prepared by Group of Experts on third party liability:

> 'The general feeling was in favour of a limitation per installation, rather than per incident, provided that the maximum amount was always available. *The view of the technical experts was that it is extremely difficult to determine exactly what constitutes a nuclear incident in view of the danger of slow or continuous radioactive contamination. Moreover, such contamination may not be considered by insurers as an incident, and* [the] *premium for installations would be lower than for* [an] *incident'*.[212]

In addition, using the standard of a nuclear installation to determine the liability of the operator gives the operator and his guarantor advance knowledge of the required maximum extent of liability to enable them to fulfil their financial obligations.[213] Another characteristic of a nuclear installation standard is that the authors of the nuclear liability conventions considered that all the nuclear installations which exist on the same site count as one nuclear installation.[214] Moreover, limiting the liability per nuclear installation is preferable, particularly in the case of a series of nuclear accidents in a nuclear installation and in the case of damage caused to the environment.

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[211] Pelzer, 1994, at p. 269.

[212] Group of Experts on Third Party Liability: Conclusions of the Third Session, 22 May 1958, [NE/LEG(58)14], para. 9, cited in Group of Governmental Experts on Third Party in the Field of Nuclear Energy, "Definition of 'Nuclear Incident' in the Paris Convention: Coverage of Normal, Lawful Release of Radiation Which Cause Damage", Not by the Secretariat, NEA/LEG/DOC(94)3, at p. 9.

[213] Camier, 1962, at p. 65.

[214] IAEA, Legal Series, No. 2, 1964, at p. 69, para. 27.

These arguments are supported by the Exposé des Motifs of the Paris Convention, which states that:

> 'Although the operator will thus be required to have financial security available for each nuclear incident, in practice insurance coverage will, it seems, only be available per installation for a fixed period of time rather than in respect of a single incident. There is nothing in the [Paris] Convention which prevents this, provided that the maximum amount available is not reduced or exhausted as a result of a first incident without appropriate measures being taken to ensure that financial security up to the maximum amount is available for the subsequent incidents'.[215]

This is reflected in practice, as insurance companies provide insurance for the nuclear industry per nuclear installation for a period of time and not on a per nuclear accident basis.[216]

Finally, the remaining problem is how to ensure that the required amounts of compensation are sufficient and available to compensate all victims of nuclear damage, and how to oblige the operator to continue taking out insurance for his liability to compensate all the victims whether or not any accident has occurred in his installation. This is because the operator has an obligation to have full coverage available in respect of each nuclear accident that may occur at his nuclear installation, and the question is how this obligation can be met with an indemnity amount that is based upon a lifetime aggregate.[217]

3.5.2 Actual damage

In general, international jurisprudence and the doctrine of international law agree that compensable damage should be based on certainty and facts.[218] This was emphasized by the PCIJ in its Judgment on the Chorzów Case between the Government of Germany and the Government of the Polish Re-

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[215] The Exposé des Motifs of the Paris Convention, para. 49.

[216] IAEA, "Insurance for Nuclear Installations", Legal Series No. 6, 1970, pp. 8-12, at p. 9; F. Lacroix, "Insurance Against Nuclear Risk in Europe", in: IAEA, Nuclear Law for A Developing World, IAEA Legal Series, No. 5, Lectures given at a training course, IAEA Vienna, 16-26 April 1968, Vienna 1969, pp. 159-166, at p. 160.

[217] Eighth Meeting of the Contracting Parties to Revise the Paris Convention, Paris 12-14 January 2000, OECD/Nuclear Energy Agency, NEA/LEG/CPPC(2000)15, at p. 3.

[218] Gerhard Bebr, "The Non-Contractual Liability of the European Coal and Steel Community", in: Henry G. Schermers, Ton Heukels and Philip Mead (eds.), Non-Contractual Liability of the European Communities, Martinus Nijhoff Publishers, Dordrecht-Boston-London, 1988, pp. 39-52, at p. 48; A. G. Toth, "The Concepts of Damage and Causality As Elements of Non-Contractual Liability", in: Schermers, Heukels and Mead (eds.), 1988, pp. 23-38, at p. 24; Pontavice, 1977, at p. 417.

public. In its judgment, the Court stated that 'it would come under the heading of possible but contingent and indeterminate damage which, in accordance with the jurisprudence of arbitral tribunals, cannot be taken into account'.[219] This means that uncertain and imminent environmental damage is not eligible for compensation. In that sense, compensable environmental damage is the direct damage caused by the activity. However, the idea of making a distinction between direct and indirect damage was rejected by the Tribunal in the Case concerning the United States Products Company (United States v. Germany South Porto Sugar Company (United States) v. Germany. The Tribunal stated that '[t]he distinction sought to be made between *damages* which are direct and those which are indirect is frequently illusory and fanciful and should have no place in international law'.[220]

The requirement of actual damage, as a condition of liability for damage caused by nuclear activities, has not been adhered to in the doctrine of international law or by the nuclear liability conventions. This is because the nature of nuclear damage is different from the nature of conventional damage. Actual damage can be proved in the case of immediate damage caused by a nuclear accident. However, it is difficult for victims to prove that they have suffered from latent damage after a nuclear accident. Such damage may only become apparent several years after the accident.[221] Therefore, it was argued that the State should bear the liability for direct and indirect damage caused by nuclear activity. Liability for the latent damage can be incurred in the light of the scientific and medical evidence.[222]

The nuclear liability conventions do not distinguish between direct and indirect nuclear damage either. The conventions cover nuclear and non-nuclear damage caused by a nuclear accident. In some cases, it is possible that nuclear and non-nuclear accidents occur at the same time, or a nuclear accident can cause nuclear as well as non-nuclear damage. Consequently, it is difficult to make a clear distinction between nuclear and non-nuclear accidents, or between nuclear and non-nuclear damage. The nuclear liability conventions therefore regarded all damage caused by a nuclear accident as

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[219] Case Concerning the Factory at Chorzów, (Claim for Indemnity) (Merits, Judment No. 13, September 13th 1928, the Government of Germany v. the Government of the Polish Republic, PCIJ, Ser. A, No. 17, 1928, at p. 57.

[220] United States Steel Products Company (United States v. Germany), Costa Rica Union Mining Company (United States v. Germany, South Porto Rica Sugar Company (United States) v. Germany, (War Risk Insurance Premium Claims, November 1, 1923, pp. 33-59), RIAA, Vol. VII, pp. 44-63, at pp. 62-63.

[221] Fadel, 1976, at p. 104.

[222] Mohamed Hafez Ghanem, "The Illegality of Nuclear Weapon Tests", in: RLES, No. 2, 1962 (Arabic vision), at p. 10, cited in Fadel, 1976, at p. 105.

nuclear damage, if it is proved that the damage caused by a nuclear accident involved a nuclear substance, nuclear fuel, nuclear waste or radioactive products related to such a nuclear installation, provided that the damage is not separate.[223] The reason for this approach is to provide further protection for the victims of a nuclear accident, and to avoid the complicated process of distinguishing nuclear damage from non-nuclear damage. Accordingly, where nuclear and conventional damage occur separately, the nuclear liability conventions are not applicable to the conventional damage. As the Exposé des Motifs of the Paris Convention states:

> '[… I]t is clear that where both the occurrence and the damage are due to radioactivity, compensation may be claimed. Similarly, where the occurrence and the damage are conventional, there will be no claim. Compensation may, however, be claimed under the Convention either where an occurrence due to radioactivity causes conventional damage or injury or where an occurrence of conventional origin causes radiation damage or injury'.[224]

Consequently, the liability of the operator for nuclear damage caused by nuclear sources which are not covered by the conventions, such as nuclear damage caused by isotopes, could be covered under this provision if a nuclear accident occurred causing nuclear as well as non-nuclear damage. Therefore the nuclear liability conventions are applicable if damage caused by a nuclear accident involves nuclear and non-nuclear damage. However, the rules of liability under ordinary law might be applicable, if the damage caused by a nuclear accident is conventional damage.[225]

Personal and property damage are undoubtedly considered as direct nuclear damage. However, the costs of measures to prevent nuclear accidents are questionable because no damage has been caused, and the measures have been taken before the damage occurs. So far no provisions have been drawn up in the nuclear liability conventions regarding the type of compensable nuclear damage. This should be determined by the competent courts. This doubt was dismissed, since the costs of preventive measures taken in the case of a threat of a grave and imminent nuclear accident are covered by the Amended Vienna Convention and the Amended Paris Convention.[226] Thus the idea of a distinction between actual and non- actual nuclear damage cannot be totally considered under the nuclear liability conventions. In the

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[223] Article IV (4) of the Vienna Convention; Article 3 (b) of the Paris Convention; Article IV of the Brussels Nuclear Ships Convention.
[224] The Exposé des Motifs of the Paris Convention, para. 8.
[225] El Shaaraoui, 1992, at p. 49.
[226] Lamm, AJH, 2000, Vol. 40, Nos. 3-4, at p. 177; NEA/NE(2002)6/REV1, para. 13, at p. 37.

meantime, certain damage can be caused by a nuclear accident, which, as we shall see, is nevertheless excluded from the nuclear liability conventions.

3.5.3 Proof of causality

For the operator of a nuclear installation to be liable for nuclear damage caused by a nuclear accident, victims of the accident have to prove the causal link between the environmental nuclear damage and the accident.[227] Proof of causality determines the scope of liability for nuclear damage, and whether or not the victims are compensated, or are left to bear all the consequences of the nuclear accident themselves. This is certainly very difficult for victims, particularly when the accident has many different consequences.[228]

It should be noted that the causal link involved here is different from the causal link which links the damage and the nuclear activity. The former is a condition for the liability of the operator under the nuclear liability conventions, i.e., the occurrence of a nuclear accident which links the damage and the activity. The elements of nuclear damage, nuclear accident and nuclear activity are three essential elements required in the nuclear liability conventions for the operator of a nuclear installation to be liable for nuclear damage. The liability of the operator is linked to the source of the damage (nuclear installation). However, the second links the damage caused to the victims and the accident. If no causal link is identified, the victim of the nuclear damage cannot be compensated under the nuclear liability conventions, but can be compensated under national law if the damage is not the result of a nuclear accident as provided for under the nuclear liability conventions.

In general, the causal link is defined 'as the connection between an event and the resulting effect'.[229] This means that the nuclear damage has to be a natural consequence and typical result of the nuclear accident.[230] The victim of the nuclear accident must provide the competent court with evidence

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[227] For the proof of causality for nuclear damage see, J. Lopuski, "Civil Liability for Nuclear Damage: Selected Questions Connected with the Revision of the Vienna Convention", OECD/NEA and IAEA, 1993, pp. 181-217, at pp. 199-202; H. Steinkemper, "Questions Raised by the Concept of Nuclear Damage in the Ambit of the Nuclear Conventions with Particular Regard to the German Viewpoint", in: OECD/NEA and IAEA, 1985, pp. 231-240, at pp. 238-240.

[228] Mohamed, 1993, at p. 400.

[229] Able J. González, "The Radiological Health Consequences of Chernobyl: The Dilemma of Causation", in: OECD/NEA and IAEA, 1993, pp. 25-55, at p. 41.

[230] Holtz, NLB, No. 40, 1987, at p. 92; Nuclear Energy Agency, Steering Committee for Nuclear Damage, Revision of the Paris Convention on Third Party Liability in the Field of Nuclear Energy and of the Brussels Convention Supplementary to the Paris Convention, Note by the Secretariat, NEA/NE(2002) REV1, para. 12, at p. 37.

proving that the damage suffered is actual damage caused by the accident. The victim is also required to prove that the damage suffered is one of the elements of nuclear damage as provided for under the applicable nuclear liability convention. However, it is not necessary to prove that the operator was at fault or negligent. This is because, as mentioned above, liability for nuclear damage under the nuclear liability conventions is based on the idea of strict liability.

The proof of causality is certainly one of the major problems in the nuclear liability conventions and must be resolved so that judges have clear rules of evidence to award compensation to victims of nuclear damage. The proof of causality is more difficult when the damage suffered by victims of a nuclear accident is the result of a nuclear and a non-nuclear accident or comprises nuclear and non-nuclear damage.[231] In that situation, victims of a nuclear accident cannot easily prove the causal link between the damage and the accident. Other causes or factors can also be a contributing factor.[232] This applies particularly to long-term damage caused by a nuclear accident, such as cancer. Such damage may appear either several years after the accident, or immediately after the victim's exposure to radioactivity. The exposure to low levels of radioactivity may produce permanent changes in the cells of the victim's body, which can cause cancer after a latency period of 3 to 40 years.[233] It was stated that:

> 'In relation to radiation exposure, causality is the unequivocal relation between the radiation health effects produced in an exposed individual or population and the presumed cause in terms of the amount of radiation exposure incurred by the individual and population. Causality can be quantified by the so-called *probability of causation*, which is a retrospective estimate of the likelihood that, among all the possible factors that could have caused a person's diagnosed radiation related health effect, a previous exposure to radiation was the actual causal agent'.[234]

This was recognized in the Report of the US Presidential Commission on Catastrophic Nuclear Accidents presented to the US Congress in 1990. According to that Report, 'the latent illnesses […] are claims for cancer induction and benign thyroid nodules alleged to have been caused by exposure to radiation as a result of a nuclear incident, but delayed in manifestation for

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[231] Handl, ELQ, Vol. 15, No. 2, 1988, at p. 242; Norbert Pelzer "Current Problems of Nuclear Liability Law in the Post-Chernobyl Period - A German Standpoint", in: NBL, No. 39, 1987, pp. 66-76, at pp. 68-69.
[232] Mohamed, 1993, at p. 400.
[233] La Fayette, NLB, No. 50, 1992, at pp. 13-14.
[234] González, 1993, at p. 41.

some years or decades'.[235] The Report also states that '[t]he central problem with claims for latent cancer induction by radiation exposure arising from a nuclear accident is proof of causation in fact. Cancers that could be radiogenic also occur spontaneously or due to exposure to other carcinogens. There is no way to distinguish directly (as opposed to inferentially) among possible causes'.[236]

Furthermore, victims of a nuclear accident have to prove that it wholly or partly occurred in a nuclear installation in the territory of a Contracting Party if there is no certain proof that there has been a nuclear accident. The victims cannot determine which accident caused the damage. This applies in particular if a number of nuclear accidents occurred at the same time in different installations operated by different operators. It is difficult for the innocent victims who have no technical knowledge to prove the causal link with the damage, 'unless the operator liable or the States concerned can produce concrete proof that the nuclear incident occurred entirely outside the territory of the Contracting Parties….'[237]

In addition, neither the nuclear liability conventions nor national legislation provide a particular standard for proving damage caused by a nuclear accident, or for determining the minimum level of radioactivity considered to be harmful.[238] Under the nuclear liability conventions, the proof of causality is left to be determined by the regular rules of evidence under national legislation.[239] However, it was noted that:

> 'If the regular rules of evidence of national laws were applied, proof of causation would be impossible and the victims would recover nothing. Therefore, in order to ensure that compensation will be paid, states must agree at an international level to more lenient rules of evidence or alternative methods of establishing causation. Even so, local judges with no specialised scientific, medical, and technical knowledge working on their own would not be able to properly assess the evidence to determine whether any particular cancer or hereditary

[235] Presidential Commission on Catastrophic Nuclear Accidents, Vol. one, August 1990, at p. 101.
[236] Ibid.
[237] Bette, Didier, Fornasier and Stein, 1965, 1965, p. 26.
[238] The reason that it is difficult to establish a clear standard to determine the causality under the nuclear liability conventions is that nuclear radiation cannot be perceived by the human senses. The harm resulting from radiation exposure can be delayed for decades after a nuclear accident and may affect future generations. See Pelzer, 1993, at p. 280.
[239] Carlton Stoiber, Alec Baer, Norbert Pelzer and Wolfram Tonhauser, "Handbook on Nuclear Law", IAEA, Vienna 2003, at p. 111.

defect was the result of exposure to ionizing radiation during a nuclear accident'.[240]

If it is difficult for victims of conventional damage to provide proof of the damage suffered under the regular rules of evidence,[241] it is even more difficult or even impossible for victims of nuclear damage to provide proof of damage caused by a nuclear accident according to the general rules of evidence. It was noted that: 'The difficulties in proving injury in cases of nuclear incidents in municipal law are well known. On the international level the complexity of the problem is even greater'.[242] This applies particularly when the damage becomes apparent after a few decades, unless there is clear evidence to assist the victims of a nuclear accident in proving the causality. Otherwise they may not be compensated.

Moreover, under the nuclear liability conventions there are certain exceptions, cases in which damage cannot be compensated even if the victim has succeeded in providing proof of causality. These may include nuclear damage caused by accidents in military nuclear installations, unknown causes of damage and unknown damage. Under the nuclear liability conventions, the operator is exempt from liability if the nuclear damage was caused in one of these situations, even if the victims of the nuclear accident have proved the causal link between the damage and its source.[243]

To reduce these difficulties, the nuclear liability conventions consider all the damage caused by a nuclear accident as nuclear damage, and consider a joint nuclear and non-nuclear accident as a nuclear accident.[244] For example, nuclear damage caused by a collision of a nuclear ship or a ship carrying nuclear substances and a ship carrying non-nuclear material goods is caused by a nuclear accident. Moreover, the development of new scientific technologies makes it easier for the experts to provide the proof of causation, and to prove whether the cause of an illness is nuclear damage or whether there are other reasons.

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[240] La Fayette, NLB, No. 50, 1992, at p. 14.

[241] According to the general rules of the ordinary law there are two main theories about the proof of causality. The first is the so-called theory of multiplicity of causes where the damage has been caused to the victims by multiple causes, and the second is the so-called multiplicity of consequences where an action causes several results. These theories are used to determine the causal link between the damage caused and its source. For further details, see Mohamed, 1993, at pp. 400-428.

[242] Handl, AJIL, Vol. 69, No. 1, 1975, at p. 51.

[243] El Shaaraoui, 1992, at pp. 52-51.

[244] Article 3 (b) of the Paris Convention; Article IV (4) of the Vienna Convention; Article IV of the Brussels Nuclear Ships Convention.

Finally, in its recommendation No. 4, the US Presidential Commission recommended the application of causation methodology to deal with such situations. It recommended establishing a system under which full compensation is provided if this methodology indicates that it is more likely that a particular illness was caused by a nuclear accident. At the other end of the scale, it also recommended establishing a level indicating that an illness is extremely unlikely to have resulted from the accident, and therefore no payment is made. Finally, it recommended establishing some level of proportionality for recovery related to the likelihood of causation for those illnesses which fall between the above two limits.[245]

3.5.4 Significant damage

As mentioned, under the nuclear liability conventions and the ILC Draft Articles and principles of international liability, environmental damage is not compensable unless it is "significant". It also refers to "serious", "severe", "grave" or "substantial" damage. Thus, significant damage is a condition for the reparation of environmental nuclear damage. Usually, significant environmental damage results from activities involving high levels of risk which can be described as disastrous damage, while non-significant damage results from normal lawful activities.[246] This is indicated by international case law[247] and numerous international instruments adopted with regard to the environment that emphasize that significant damage is a condition for compensation for damage caused by hazardous activities.[248] In the Trail Smelter Arbitration, the Tribunal stated that:

> 'The word "damage", as used in this document shall mean and include such damage as the Governments of the United States and Canada may deem appreciable, and for the purposes of paragraphs (a) and (c) hereof, shall not include occasional damage that may be caused by SO_2 fumes being carried across the

[245] Presidential Commission on Catastrophic Nuclear Accidents, Vol. one, August 1990, at pp. 10-11.
[246] YILC, 1990, Vol. II, Part One, UN. Doc. A/CN4/428 and add.1, at p. 89, para. 21.
[247] See Lac Lanoux Arbitration (France v. Spain), November 16, 1957, ILR, Vol. 24, 1957, p. 101.
[248] Principle 6 of the Stockholm Declaration; Article IX and X (a) of the 1966 Helsinki Rules on the Uses of the Waters of International Rivers, adopted by the International Law Association at the fifty-second conference held in Helsinki on 20th August, 1966. Report of the Committee on the Use of the Waters of International Rivers (London International Law Association, 1967), available at: http://www.unece.org/env/water/meetings/legal_board/2010/annexes_groundwater_paper/Annex_II_Helsinki_Rules_ILA.pdf (accessed on 26.4.2012), reprinted in Munro and Lammers, 1987.

international boundary in air pockets or by reason of unusual atmospheric conditions'.[249]

In its judgment of 28 June 1937 between the Netherlands and Belgium in the case concerning "The Diversion of Water from the Meuse"[250] the Permanent Court of International Justice stated that:

> 'The Court has not found any reason in the documents submitted to it which would lead it to conclude that the water discharged through the Neerhaeren Lock has set up an excessive current in the Zuid-Willemsvaart, or has depleted the Meuse to such an extent as to prejudice navigation on that river.
>
> In the foregoing remarks, the question of the utilization of the side-channels of the Neerhaeren Lock for feeding the reach below the lock is not taken into consideration. The Court is only considering the normal use of this lock for purposes of navigation'.[251]

Moreover, the Court also stated that 'in the absence of evidence as to the effects which the use of the Neerhaeren Lock produces on the current in the Zuid-Willemsvaart, or on the Meuse itself, the Court does not consider that the normal use of this lock is inconsistent with the Treaty'.[252]

Under the ILC Draft Articles on international liability for injurious consequences arising out of acts not prohibited by international law, liability is limited to hazardous activities not prohibited by international law which cause significant transboundary environmental damage by their physical consequences.[253] This is because only significant damage can spread across the borders of the State in whose territory the activity is located or under whose jurisdiction or control it is carried out. It is prohibited under international law because it 'occurs within the territory of another State [and] breaches its real interests protected by international law'.[254] The same applies with regard to the nuclear liability conventions which distinguish between major nuclear activities and minor nuclear activities, and major nuclear accidents and minor nuclear accident. Environmental damage caused by major nuclear activities and major nuclear accidents is covered by the conventions, while environmental damage caused by minor nuclear activities and by minor nuclear accidents is excluded.

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[249] RIAA, Vol. III, at p. 1946.
[250] The Diversion of Water from the Meuse, Judgment of 28 June 1937, the Government of the Kingdom of the Netherlands and the Government of the Kingdom of Belgium, PCIJ, Series A/B, 70, 1937.
[251] PCIJ, Series A/B, 70, 1937, at p. 23.
[252] PCIJ, Series A/B, 70, 1937, at p. 25.
[253] Simma, NJIL, Vol. 67, No. 4, 1998, at p. 435.
[254] Gadkowski, 1989, at p. 56.

This condition was described as important 'to define legally significant harm because environmental interferences are so pervasive and numerous'.[255] On the other hand, it was considered that this condition is less precise and leaves room for subjective judgments and that it is impracticable and difficult to formulate as a general rule in precise terms.[256] This is particularly true because there are no criteria to determine what is considered significant and non-significant environmental damage. In the end, the decision on this matter is in the hands of the judge who has to decide what is significant and what is non-significant environmental damage according to the evidence that is presented and on the basis of his expertise.

3.5.5 The damage may not be compensated twice

As long as liability for nuclear damage is governed by the rules of civil and international liability, environmental damage caused by a nuclear accident can be compensated by national courts and international courts. Therefore, if the victim has claimed compensation for environmental damage caused by a nuclear accident from a national court, he is not entitled to sue for compensation for the same damage from an international court, or to be compensated twice for the same damage from national and international courts. This condition is based on the principle of justice.[257] In the Chorzów Case between the Government of Germany and the Government of the Polish Republic, the Judgement of the Permanent Court of International Justice rejected Germany's claims to prevent exports from the Chorzów factory in order to prevent damage caused by its competitors to Bavarian factories in future.[258] The Court considered Germany's claim to prevent the exports of the factory to be satisfactory, but it denied it because Germany also claimed for compensation for its loss caused by the factory. The Court considered that Germany was claiming twice for reparation of the same damage.[259] It stated that: 'The prohibition of exports asked for by the German Government cannot therefore be granted, or the same compensation would be awarded twice over'.[260]

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[255] Schachter, 1991, at p. 366.
[256] Schachter, 1991, at p. 366.
[257] Fadel, 1976, at p. 102.
[258] PCIL, Series A, No. 17, September 13th, 1928, Case Concerning the Factory at Chorzów, at p. 57.
[259] Fadel, 1976, at p. 103.
[260] PCIJ, Series A-No. 17, at p. 59.

3.6 Conclusions

This chapter showed that damage is the main object and reason for a State's liability for environmental damage caused by nuclear activities. Liability cannot be attributed to the operator of a nuclear installation or to the State without damage being caused by a nuclear activity in its territory or under its jurisdiction or control. It also revealed that nuclear damage is a difficult issue to define within the body of international law. The definition of nuclear damage is important to determine the rights of the victims who are protected by international law. The Chernobyl accident revealed that a major nuclear accident may cause not only personal and property damage inside the country in whose territory the accident occurred, but also transboundary damage beyond the borders of the State. Radioactive material resulting from the accident spread over a large number of countries and caused serious damage to man and the environment which would not be covered by the nuclear liability conventions if they were applicable. This showed the important need for a broader definition of nuclear damage under international nuclear liability law to protect the rights of victims of a nuclear accident.

The concept of environmental nuclear damage has been developed along with the nuclear liability conventions and the work of the ILC on the codification of international liability. Initially the nuclear liability conventions defined the concept of nuclear damage as personal and property damage. Environmental damage was not covered under these conventions, but was left to national law.

After the Chernobyl accident, the Amended Paris and Vienna Conventions expanded the definition of nuclear damage to include, in addition to personal and property damage, environmental damage, costs of preventive measures, costs of the reinstatement of the impaired environment to its previous condition, and economic loss. This leads to an increase in the number of victims to be compensated under these conventions, at least in principle. On the other hand, it leads to a decrease in the amount of compensation for each victim. This is because the amount of liability under the conventions is limited on a "per nuclear accident" basis. A similar definition was developed in the 2006 ILC Draft principles on the location of loss with regard to environmental damage caused by hazardous activities. Nevertheless, environmental damage has not been adequately defined in the doctrine of international law. Some jurists are in favour of a broader concept of environmental damage to include personal and property damage caused as a result of the impaired environment. However, others prefer excluding such damage from the concept of environmental damage because it is covered under a separate heading of nuclear damage. Moreover, reasonable costs of preventive meas-

ures and the reinstatement of the impaired environment are covered where they are carried out by the persons appointed and approved by the competent authorities. The competent court according to national law has been left to evaluate reasonable measures to be compensated. Pure environmental damage or pure ecological damage is excluded. Finally, economic loss is covered by the nuclear liability conventions and the ILC Draft principles on the location of loss, and is only compensated after the original damage is remedied. Therefore it is difficult to compensate economic loss caused as a result of the impaired environment where environmental damage is not covered. However, pure economic loss to the environment is excluded from the cover of the nuclear liability conventions. Pure economic loss caused to the environment is not considered environmental damage. It is left to be decided by the competent court in accordance with national law.

A number of obligations have been adopted in the ILC Draft Articles on prevention of harm and the ILC Draft principles on the allocation of loss regarding State liability for lawful activities and prevention of damage. These obligations are significant to prevent, reduce and remedy nuclear damage caused to the environment by a nuclear accident. To prevent and to reduce such damage, the costs of preventive measures are covered by the regime of international liability. The violation of these obligations means that the State is responsible for a wrongful act. Damage caused as a result of a State's liability for a wrongful act is not a constitutive element in State responsibility for wrongful acts. It is so-called legal damage or moral damage.

Finally, not all environmental damage caused by a nuclear accident is subject to compensation. According to the nuclear liability conventions and other norms of international law, there are certain conditions required for the reparation of environmental nuclear damage. First, the environmental damage must be caused by a nuclear accident or a nuclear activity. Secondly, the damage should be the actual and typical result of a nuclear accident. Thirdly, there must be causal link between the damage and the accident or the activity, i.e., proof of causality. Fourthly, environmental damage caused by a nuclear accident should not be compensated twice; environmental damage caused by a nuclear accident which has been compensated under the national law regime cannot then be compensated under international law.

PART II:

THE PRIMARY OBLIGATIONS FOR THE PREVENTION AND REDUCTION OF ENVIRONMENTAL NUCLEAR DAMAGE: THE PREVENTIVE FUNCTION OF INTERNATIONAL RESPONSIBILITY

Introduction

Like most hazardous activities, nuclear activities are permitted under international law, provided that the State prevents the potential damage that can be caused by such activities to other States. This is a general principle of international law, and breaching this obligation incurs State responsibility. However, the classical rules of international liability impose responsibility upon the State only for damage caused to another State. This necessitated the development of the role of international liability so that damage caused by such activities could be prevented, rather than waiting until the damage occurred, and then repairing it. It was considered that international liability should deal with the legal problems of liability for damage caused by using the new technology. It should not rely only on the classical function of liability to provide compensation and repair the damage caused by a hazardous activity, but it should also have a preventive function aimed at preventing damage caused by the activity.

This was recognized particularly after the Chernobyl accident which drew the attention of the international community as a whole to the need to establish a comprehensive international mechanism aimed at the prevention, mitigation and reparation of environmental damage caused by nuclear activities. During the past three decades the main features of this regime have been developed in the doctrine of international law and by the ILC in its Draft Articles on international liability. This regime involves three aspects: the rules and measures for the prevention of nuclear damage, such as international safety standards and measures to verify related compliance; the provisions for mitigating the consequences of nuclear accidents, such as providing information and assistance in the event of a nuclear accident; and finally, reparation of environmental damage caused by the accident.[1]

The reparative function of international liability will be examined later in Part III of the study. Part II focuses on an examination of the preventive functions of international liability. It examines the State's obligation of pre-

[1] In general, see David Hunter, Julia Sommer and Scott Vaughan, "Environment and Trade Concepts and Principles of International Law: An Introduction", in: GELA, Vol. III, 1995, pp. 99-134; D'Amato and Engel (eds.), 1996, pp. 137-143; Katharina Kummer, "International Management of Hazardous Wastes: the Basel Convention and Related Legal Rules", Clarendon Press, Oxford University Press, New York, 1995, at pp. 16-25; Nicolas de Sadeleer, "Environmental Principles: From Political Slogans to Legal Rules", Oxford University Press, New York, 2002, at pp. 61-90; Johan G. Lammers, "Prevention of Transboundary Harm From Hazardous Activities: The ILC Draft Articles", in: HYIL, Vol. 14, 2001, pp. 3-24.

vention and the procedural rules and obligations required for the safe operation of nuclear activities to prevent and reduce environmental damage caused to other States and other areas outside its territory. The procedural obligations are imposed upon a State to ensure that nuclear activities are carried out with caution in order to avoid a nuclear accident and to reduce environmental damage if a nuclear accident occurs despite this. These obligations are primary norms and principles which perform a preventive role in international responsibility. They will be studied in two chapters. Chapter 4 examines the legal basis of the principle of prevention as an essential principle of international law for the prevention and reduction of environmental nuclear damage. Chapter 5 discusses the procedural obligations and norms required for the safe operation of a nuclear activity to prevent nuclear accidents caused by nuclear activities and to prevent and reduce harmful consequences for the environment.

4 THE OBLIGATION OF PREVENTION AND REDUCTION AS AN ESSENTIAL OBLIGATION FOR STATE RESPONSIBILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY NUCLEAR ACTIVITIES

4.1 Introduction

This chapter argues for the obligation of prevention as a fundamental principle in contemporary international law, and its effectiveness in protecting the environment against damage caused by nuclear activities. Nowadays, the principle of prevention is one of the fundamental principles in contemporary international law, and is necessary to protect the environment against the hazards of nuclear activities. According to the principle, a State carrying out nuclear activities in its territory or under its jurisdiction or control is obliged not to cause environmental damage to other States. It must take precautionary and preventive measures, and exercise due diligence to prevent environmental damage caused by such activities, and to reduce any harmful consequences if a nuclear accident does occur. These measures are mainly procedural and are aimed at controlling the activities. It also must cooperate with other States, particularly the affected States, in providing the necessary information regarding the activity. This helps to prevent and minimize environmental damage caused by the activities.

The chapter focuses on an examination of the issues in the prevention and reduction of damage and other related issues, according to the general rules of international law, as a tool to prevent and reduce environmental damage caused by nuclear activities. An examination of these issues gives rise to certain questions which have to be answered in this study in order to determine the legal basis of the principle of prevention, and its effectiveness in preventing and reducing the environmental damage caused by a nuclear accident. These questions are: Does international law impose upon the State carrying out nuclear activities within its territory, or under whose jurisdiction or control they are carried out, any standard or obligation to ensure that these activities do not cause environmental damage to other States or to the global environment? If so, what sort of obligation? Is it a general obligation, resulting in State responsibility for the violation of its environmental obligations,

or is it merely a non-binding principle? Is it a principle of customary international law, or a general principle of international law? What is the legal basis of the principle?

The answer to these questions determines the legal basis of the obligation to prevent and minimize environmental damage caused by nuclear activities. The principle will be studied on the basis of the relevant sources of international law. According to these sources, there is evidence for this principle in customary international law, general principles of international law,[1] the doctrine of international law,[2] international case law[3] and it is also reflected in international legal practice.[4] It has been embodied in a number of multilateral, regional, and international declarations such as the UNEP Principles[5] and bilateral agreements dealing with the protection of the environment from hazardous activities in various areas of international law.[6] It was recently

[1] Alexandre Kiss and Dinah Shelton, "Guide to International Environmental Law", Martinus Nijhoff Publishers, Leiden/Boston, 2007, at p. 91; Birnie and Boyle, 1992, at p. 89; Patricia W. Birnie and Alan E. Boyle and Catherine Redgwell, "International Law & the Environment", Third Edition, Oxford University Press, Oxford, New York 2009, at p. 137; Jonathan Verschuuren, "The Case of Transboundary Wetlands Under the Ramsar Convention: Keep the Lawyer Out!" in: CJIELP, Vol. 19, No. 1, 2008, pp. 49-127, at p. 76.

[2] See Günther Handl, "National Uses of Transboundary Air Resources: The International Entitlement Issue Reconsidered", in: NRJ, Vol. 26, 1986, No. 3, pp. 405-467, at pp. 427-429; Birnie and Boyle, 1992, at p. 89; Brian D. Smith, State Responsibility and Marine Environment: The Rules of Decision", Clarendon Press, Oxford, New York, Toronto, 1988, at p. 72; Kirgis, AJIL, Vol. 66, 1972, at p. 315. Fourth report on international liability for injurious consequences arising out of acts not prohibited by International Law, by Mr. Julio Barboza, Special Rapporteur, doc. A/CN.4/413 and Corr.1 & 2, YILC, 1988, Vol. II, Part One, at p. 266, paras. 103-111.

[3] The ICJ advisory opinion of 8 July 1996 on the "Legality of the Threat or Use of Nuclear Weapons", ICJ Reports, 1996, p. 226, at pp. 241-242, para. 29. The ICJ, Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), 20 April 2010 Judgment, at pp. 56-59, paras. 199-202. The Judgment is available at: http://www.icj-cij.org/docket/files/135/15877.pdf?PHPSESSID=f59011c4e4079882 (accessed on 25.5.2010).

[4] For State practice on international liability see two studies prepared by the UN Secretariat, the first in 1984 on "Survey of State Practice Relevant to International Liability for Injurious Consequences Arising out of Acts Not Prohibited by International Law", UN General Assembly Doc., A/CN.4/384, 1984. The second on the same topic in 1995, UN, General Assembly Doc., A/CN.4/471, 1995.

[5] See Principle 1 of the 1978 UNEP Environmental Law Guidelines and Principles on Shared Natural Resources. The text of the Principles is available at: http://www.UNEPEnvironmental-Law-Guidelines-and-Principles.pdf (accessed on 24.5.2010).

[6] For environmental instruments see, Sands and Galizzi (eds.), 2006.

codified by the ILC in the Draft Articles on international liability for harm caused by lawful activities. It was embodied in the 2001 ILC Draft Articles on Prevention of Transboundary Harm Caused by Hazardous Activities[7] and in the 2006 Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities.[8] In addition, the 2001 ILC Draft Articles on State Responsibility for Wrongful Acts apply if the principle is violated.[9] These Articles codified the issues of prevention and international liability in general terms to apply to environmental damage caused by nuclear activities in the absence of an inter-state treaty to cover them.

In the following section the chapter considers whether the principle of prevention is a general norm or a customary principle of international law or a general principle of international law, as distinguishing between them is very difficult in practice. Section 4.3 examines the legal basis of the obligation of prevention under the general rules of international law. This includes the obligation of a State not to cause environmental damage to other States, preventive measures, the principle of due diligence and the precautionary principle. Section 4.4 investigates the principle of cooperation and its importance with regard to the introduction of the procedural rules and obligations regarding the prevention and reduction of environmental damage caused by a nuclear accident. Section 4.5 concludes that the obligation of prevention is an essential principle in international law. It consists of a number of international procedural obligations which must be implemented by the State of origin and other States in order to avoid environmental damage likely to be caused by nuclear activities.

4.2 Is the obligation of prevention a general norm or a general principle or a principle of customary international law?

In general, there is evidence in the doctrine of international law, international instruments and judicial decisions to support the distinction between general

[7] For the text of the 2001 draft Articles on prevention along with commentaries adopted on second reading by the ILC, see the Report of the International Law Commission on the work of its 53rd session, UNGA Official Records, Supplement No.10 (A/66/10), pp. 370-436.

[8] The 2006 Draft principles on the allocation in the case of transboundary harm arising out of hazardous activities, with commentaries in 2006, and submitted to the General Assembly (A/61/10), at p. 110, para. 67.

[9] For text of the 2001 Draft Articles on State Responsibility for Internationally Wrongful Acts, with commentaries see, Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10), ch. V.

norms and the principles of international law.[10] According to Verschuuren, there are some differences between the rules of international law and the general principles of international law, but it is difficult to make a clear distinction between them. He argues: There is a sliding scale with a theoretical, abstract and indeterminate principle on [the] one [... hand] and a very concrete, highly practical rule on the other. Both principles and rules can range from [being] abstract to [being] more concrete'.[11] However, other lawyers use the terms "rule", "obligation" and "principle" with the same meaning to indicate a general or customary obligation of State responsibility for environmental damage.[12]

In practice, the principles of law have a higher moral character than the rules of law and form the basis of their functions in national and international law. According to Verschuuren, these functions include, inter alia: help with defining open or unclear statutory rules; strengthening the normative power of statutory rules; increasing legal certainty and enhancing the legitimacy of decision making, forming the basis for new statutory rules; providing guidelines for self-regulation and negotiation processes between various actors in society; creating flexibility in the law; playing an important role in the implementation of international obligations in national law; stimulating the integration of environmental considerations in other policy fields; creating the necessary links between ideals and concrete legal rules.[13] The functions of the principles were also addressed in the 1992 United Nations Framework Convention on Climate Change.[14] This referred to the importance of these principles in the implementation of the provisions of the Convention. It considers them to be guidelines for its States Parties to achieve the objectives of the Convention, and to implement its provisions.[15]

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[10] Sands, 2003, at p. 232; Ulrich Beyerlin, "Different Types of Norms in International Environmental Law: Policies, Principles and Rules", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 425-448, at p. 432; Graefrath, RDC, Vol. 185, Part II, 1984, at p. 52.

[11] Jonathan Verschuuren, "Principles of Environmental Law: The Ideal of Sustainable Development and the Roles of Principles of International, European, and National Environmental Law", Baden-Baden: Nomos Verlagsgesellschaft, 2003, at p. 38.

[12] Faure & Nollkaemper, 2007, at p. 144; Roda Verheyen, "Climate Change Damage and International Law: Prevention Duties and State Responsibility", Martinus Nijhoff, Publishers, The Netherlands, 2005, at p. 147.

[13] Verschuuren, 2003, at pp. 38-41.

[14] The text of the Convention is available at: http://unfccc.int/resource/docs/convkp/conveng.pdf (accessed on 31.8.2009).

[15] Article 3 of the 1992 United Nations Framework Convention on Climate Change; see also Article 3 of the 1992 Convention on Biodiversity Convention, available at: http://www.cbd.int/convention/convention.shtml (accessed on 31.8.2009); the 2003 Consolidated Versions of the Treaty on European Union and of the Treaty Establishing the

In addition, in the definition of an internationally wrongful act, the ILC made a distinction between the terms "rule or norm" and "obligation". It indicated that a breach consisting of a wrongful act is a breach of an international obligation of a State and a breach of a norm.[16] Finally, this distinction was clearly made in the Gentini case in 1903 (Italy v. Venezuela). The Tribunal stated that:

> "A 'rule'… 'is essentially practical and, moreover, binding …; there are rules of art [just] as there are rules of government' while [the term] principle 'expresses a general truth, which guides our action, serves as a theoretical basis for the various acts of our life, and the application of which to reality produces a given consequence'."[17]

Furthermore, in relation to the application of the rules of general customary international law, Judge G. Morelli, in his separate opinion in the Case Concerning the Barcelona Traction, Light and Power Company, Limited, Belgium v. Spain, Judgment of 5 February 1970, argued that:

> '[... T]he international rules concerning the treatment of foreigners, although they are rules of general international law and, as such, are binding on every State with regard to every other State, take concrete form in the shape of bilateral legal relationships, so that a State's obligation to accord the required treatment to a particular person exists solely towards the national State of that person and not towards other States'.[18]

According to Cheng, 'the general principles of law form the basis of positive rules of law'.[19] Accordingly, the principles of law have a moral character and form the theoretical basis which guides States to implement rules of law. This is true, but in my view the rule of law is the foundation of any principle

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European Community. Official Journal of the European Union, 29.12.2006, C 321 E/1, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2006:321E:0001:0331:EN:PDF (accessed on 18.4.2012) and 30.3.2010, Official Journal of the European Union, C 83/1, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:FULL:EN:PDF (accessed on 18.4.2012).

[16] YILC, 1970, Vol. I, at p. 225, para. 29.

[17] RIAA, Vol. X, pp. 551-561, at p. 556. This quotation is in French and translated and cited in Bin Cheng, "General Principles of Law As Applied by International Courts and Tribunals", Grotius Publications Limited, Cambridge UK, 1953, reprinted 1987, at p. 376. The same quotation is also cited in Sands, 2003, at p. 233.

[18] ICJ Reports, 1970, at p. 226.

[19] Cheng, 1987, at p. 376; Hanna Bokor-Szegö, "General Principles of Law", in: Mohammed Bedjaoui, International Law Achievements and Prospects, UNESCO, Paris, Martinus Nijhoff Publications- Dordrecht/Boston/London, 1991, pp. 213-220, at p. 217.

of law. The rule of law is a provision which can be embodied in any agreement, judicial decision, principle of law or any other source of law, and binds States to respect the rights of other States.

Thus customary and general principles of international law are composed of certain rules and provisions which constitute the basis of these principles. One of these principles which constitutes the basis of State responsibility for environmental damage is the principle of prevention.[20] However, the application of these principles is not transparent in practice because they are in some cases embodied in non-binding international instruments, while their scope and extent of application cannot be determined in other cases. For example, the principle of notification has been recognized in practice but has not been applied by States in practice. The failure of the USSR to apply this principle in the Chernobyl accident necessitated the formulation of the principle in more detailed terms in conventional provisions.[21] However, the unusual speed of the adoption of the 1986 Notification and Assistance Conventions,[22] which were adopted within only one month of the negotiations, indicates that there was evidence for the existence of customary international law on the principle of notification prior to the formulation of the norms in these conventions. What emerged in the aftermath of the Chernobyl accident necessitated the recognition and codification of the principles in specific norms.[23]

Nevertheless, there are some obstacles which stand in the way of developing customary international law in general for the protection of the environment. For example, '[t]he renaissance of custom requires the articulation of a coherent theory that can accommodate its classic foundations and contemporary developments'.[24] There is no theory to explain the role of custom-

[20] Principle 21 of the Stockholm Declaration.

[21] Alexandre Kiss and Dinah Shelton, "International Environmental Law", Third Edition Transnational Publications, Inc. Ardsley, New York, 2004, at p. 85 and for customary and general principles in international environmental law, see pp. 84-88.

[22] The 1986 Convention on Early Notification of a Nuclear Accident, IAEA Doc. INFCIRC/335, 18 November 1986. The text is also available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc335.shtml (accessed on 2.6.2010); the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, IAEA Doc. INFCIRC/336, 18 November 1986. The text also is available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc336.shtml (accessed on 2.6.2010). The two Conventions were adopted at the IAEA Headquarters in Vienna on 26 September 1986. The first entered into force on 27 October 1986 and the second on 26 February 1987.

[23] D'Amato and Engel (eds.), 1996, at p. 12.

[24] Anthea Elizabeth Roberts, "Traditional and Modern Approaches to Customary International Law: A Reconciliation", in: AJIL, Vol. 95, No. 4, 2001, pp. 757-791, at p. 757.

ary international law and its doctrine.[25] Furthermore, the developing nations are still opposed to accepting customary international norms as a source of liability for the protection of the environment. They believe that the acceptance of these principles is an obstacle to their development. They accuse the developed nations of damaging the environment with harmful activities carried out in their territory or under their jurisdiction or control after benefiting from these activities because their countries developed at the beginning of the twentieth century without any environmental standards. Now they argue that the developed countries should bear the responsibility for the protection of the environment.[26] The principle of customary international law cannot constitute a principle of international law unless it has been accepted by both the developed and developing countries. To some extent, this highlights the difference between the principles of customary international law and the general principles of international law which are adopted only by the developed nations. According to Dupuy:

> '[T]he customary law status of a rule depends on whether the principle is invoked by a majority of states, comprising both developed and developing countries, by a regional group of states (as in the case of the support expressed by the members of the European Union), or even by the international community, including international civil society. In addition, it depends on whether the principle has been referred to, or put into operation, in a treaty, in a soft law instrument, in judicial or semi-judicial decisions, or in other expressions of state practice. Therefore, the process of the *formation* of customary international law, and that of its *consolidation* as a rules of positive international law are two sides of the same coin, which is suggested by the fact that the concept of 'custom' refers to both the lawmaking process and to the end result of that process-a legally binding norm at the universal, or, more, rarely, the regional, level'.[27]

The general principles of international law adopted in Article 38 (1) (c) of the ICJ Statute are those adopted by the developed nations. Therefore those adopted by the developing nations are excluded. Moreover, some authors stipulate that the general principles of national law are not in themselves considered as general principles of international law, unless they have been accepted at the international level.[28] In addition, in practice it is difficult to

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[25] Andrew T. Guzman, "Saving Customary International Law", in: MJIL, Vol. 27, Issue 1, 2006, pp. 115-176, at p. 117.
[26] D'Amato and Engel (eds.), 1996, at p. 15.
[27] Pierre-Marie Dupuy, "Formation of Customary International Law and General Principles", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 449-466, at p. 451.
[28] Lammers, 1984, at pp. 161-164. In general, principles of law as a source of law are adopted in national law or in custom or in treaties. The latter, in some cases, also codify

customary rules. (John H. Currie, Craig Forcese and Valerie Oosterveld, "International Law: Doctrine, Practice, and Theory", Published by Irwin Law, Toronto, 2007, at p. 136) The general principles of law of the civilized nations are adopted in Article 38 (1) (c) of the ICJ Statute to allow the courts to apply them in international cases besides other sources of international law or where there are no provisions in treaty law or customary international law to govern a specific matter. (Oppenheim's International Law, Vol. I, 1996, at p. 36) 'In thus opining the way for the operation as international law of general principles of municipal jurisprudence, it must be noted that such principles are in the municipal sphere applied against a background of national laws and procedures. Unless there is some sufficient counterpart to them in the international sphere, or sufficient allowance is made for them in abstracting the principles from the various municipal rules, the operation of the principles as a source of particular rules of international law will be distorted'. (Oppenheim's International Law, Vol. I, 1996, at p. 37)

Nevertheless, there are some doctrinal differences about accepting the principles of the civilized nations as adopted in Article 38 (1) (c) of the ICJ Statute to be principles of international law or as a source of international law. The majority of the doctrine of international law argues that the courts should apply these principles where there are no applicable provisions in treaty or customary international law. This opinion considers that the general principles of law are an affirmation to the Natural Law. Others, following a socialist doctrine, argue that they should be applied only when they were accepted at the international level as principles of international law. (Shaw, International Law, 2008, at p. 99; John H. Currie, "Public International Law", second edition, Irwin Law Inc. Toronto, 2008, at p. 101) Indeed, according to the supporters of the Natural Law approach, the principles include international norms and have value above the detailed provisions of the law. Thus, in that sense, as was stated, national law is more developed than international law. (Alina Kaczorowska, Public International Law, Third Edition, OLD Balley Press, 2005) However, according to the second approach, not any principle can be regarded as a principle of international law. Only those included in treaty and customary international law and reflecting the consent and will of States are considered to be principles of international law, as only agreements or custom express the will of States. Accordingly, the principles adopted by customs or in treaties are only principles of international law and principles of the civilized nations are not considered principles of international law.

In my point of view, Article 38 (1) (c) of the ICJ Statute must be amended to provide for the principles of law in all nations because there is no clear dividing line between the so-called civilized and uncivilized nations. On the other hand, these principles will apply to all cases and disputes in all States. Furthermore, the ICJ members are composed of judges from all the civilization and principal legal systems in the world. (Article 9 of the ICJ Statute) In this respect, it was stated that, '[a] better view of Art. 38 1 (c) is that its purpose is to ensure that international law includes rules and principles common to all legal systems because such rules are part of the structure of 'the law'. If international law is to be accepted as a system of law, it must incorporate those procedural and administrative rules which are inherent in the concept of every legal system and, therefore, part of the law of every state'. (Martin Dixon, "Textbook on International Law", Sixth Edition, Oxford University Press, New York, 2007, at p. 41)

see the sources of and differences between the customary and general principles of international law,[29] as many principles of general rules have become principles of customary international law. In the North Sea Continental Shelf Cases, the ICJ stated that '[c]ustomary international law is evidenced by the practice of states by reference to published material, statements of the national government and state's own laws and judicial decisions and its acceptance as law'.[30]

However, customary and general principles of international law play a significant role in the protection of the rights of the States and their subjects, including the protection of the environment against damage caused by hazardous activities. These principles have gradually emerged and are still being developed. The essence of these principles is the principle of State sovereignty, which is aimed at protecting the political integrity of the State. This principle is complemented by other principles such as the principle of not abusing rights, neighbourliness, due diligence, and more recently, the polluter pays principle and the precautionary principle. Other procedural principles, including the duty of cooperation and providing information, are also

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Indeed, principles of law 'have a certain normative quality; for cases of non-observance of and non-compliance with a legal principle immediately call for a condemnatory statement. Principles of law would seem to constitute the inner sanctum of any legal order, delivering guidance to, and preferably steering the conduct of, lawyers, judges, politicians, even the public –at-large'. (Henri de Waele and Eva Rieter, "Introduction: Evolving Principles of International Law-The Quest for Demarcation", in: Eva Rieter, Henri de Waele (eds.), Evolving Principles of International Law: Studies in Honour of Karel C. Wellens", Martinus Nijhoff Publishers, Leiden-Boston, 2012, at p.1) The thesis referred to Article 38 (1) (c) throughout the text and showed that the principles discussed in it are recognized in international law as general principles, i.e. due diligence principle, the principle of prevention, the polluter pays principle etc. at the same time environmental international law is a branch of public international law. Thus the word principle in general international law has the same meaning as in international environmental law. There are also some international principles established by international courts and tribunals such as the principle of prevention of harm resulting from hazardous activities which its roots traced to the Trail Smelter Arbitration. On the other hand, there are some principles established by national law such as the polluter pays principle and later became an international principle. Thus, there is overlap between general principles of law and general principles of international law. (Brownlie, Principles of International Law, 2008, at p. 19)

[29] Erik Jaap Molenaar, "Coastal State Jurisdiction Over Vessel Source Pollution", Kluwer Law International, The Hague/Boston/London, 1998, at pp. 41-42.

[30] North Sea Continental Shelf Cases (Federal Republic of Germany/Denmark; Federal Republic of Germany/Netherlands), 20 February 1969 Judgment, ICJ Reports 1969, p. 3, cited in Daud Hassan, "Protecting the Marine Environment from Land-Based Sources of Pollution: Toward Effective International Cooperation", Ashgate Publishing Limited, England, USA, 2006, at p. 70.

significant. These principles impose certain obligations on States to prevent damage to the environment in the States and the global commons, when they carry out hazardous activities within their territories or under their jurisdiction or control. International law requires States not to abuse the rights which they have been given by law to carry out hazardous activities, to exercise due diligence and take precautionary measures to protect the environment, and to pay the economic costs of pollution, if such pollution has nevertheless occurred.

In the MOX Plant Case the International Tribunal for the Law of the Sea restored the importance of customary international law by protecting the environment against damage caused by nuclear activities.[31] In that case, Ireland claimed that the UK had violated the duty of cooperation and the duty to provide the relevant information about the disputed activity, and had failed to assess the potential risks and effects on the marine environment of the Irish Sea arising from the operation of the plant and international movements of radioactive materials and wastes associated with the plant.[32] The Tribunal therefore examined the duty of cooperation and other procedural obligations and their application in practice.

In addition, some of these principles are considered by some authors to apply to liability, and to serve as the basis for liability in national and international law. Some of these principles are also related to procedural obligations such as the principles of precaution and prevention, while others are obligations of customary law, such as the Stockholm and Rio principles. For example, these last two principles are embodied in the principle of sovereignty, the principle not to abuse rights and the principle of neighbourliness. In practice it is difficult to distinguish between the functions of these principles, as every principle and every theory has its uses and its own particular characteristics and must be applied separately in different cases.

In conclusion, the principle of prevention is related to other principles of general and customary international law. This reflects its status as an essential principle of general and customary international law.

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[31] The International Tribunal of the Law of the Sea, The MOX Plant Case, (Ireland v. United Kingdom), Request for provisional measures, 3 December 2001. The judgment is available at: http://www.itlos.org/start2_en.html (accessed on 25.4.2010).

[32] Order of 3 December 2001, para. 26.

4.3 The obligation of a State to prevent and reduce environmental nuclear damage

The principle of prevention requires the Installation State not to cause environmental damage to other States when it conducts nuclear activities, and to take all precautions and exercise due diligence to ensure that the activity does not cause environmental damage to other States. This includes all the preventive and necessary measures consistent with international law that are necessary to prevent, minimize and control damage which could be caused by a nuclear accident. These principles constitute the legal basis of the duty to prevent environmental damage caused by a nuclear accident.

The obligation of prevention also includes providing information and cooperation between States, because environmental damage cannot be prevented unless the relevant information is provided. The same applies with regard to cooperation between States, because it is difficult to prevent damage without cooperation. This shows that the principle of providing information and the principle of cooperation are interrelated. The two principles are aimed at controlling the activities in order to prevent and reduce damage.

4.3.1 The obligation of a State not to cause environmental damage to other States

When a State conducts hazardous activities such as nuclear activities, it must observe the rights of other States, take the necessary measures to protect the global environment, and carry out the hazardous activities in a reasonable way without causing damage to other States or the environment.[33] The rationale behind this principle is that the absolute freedom of a State to conduct hazardous activities means that it could interfere with and harm the interests of other States and the environment.[34] The principle describes the legal rights of States to carry out hazardous activities and their responsibility for transboundary environmental damage under customary international law.[35] Therefore the principle not to cause damage to other States is also linked to the State's obligation to prevent and reduce damage to other States.[36] Despite this, some lawyers have made a distinction between the obligation to prevent damage and the obligation to reduce damage. The first is

[33] Alan E. Boyle, "Land-Based Sources of Marine Pollution: Current Legal Regime", in: MP, Vol. 16, No. 1, 1992, pp. 20-35, at pp. 20-22.
[34] Smith, 1988, at p. 72.
[35] David Hunter, James Salzman and Durwood Zaelke (eds.), "International Environmental Law and Policy", Foundation Press, Thomson, New York, 2007, at p. 502.
[36] Hunter, Salzman and Zaelke (eds.), 2007, at p. 507.

concerned with the prevention of new pollution caused by a hazardous activity, while the second concerns reducing the existing pollution.[37] In the first case, the State has to take all possible care to prevent the event. However, in the second case, the event has already occurred, and the State should do all it can to reduce its harmful consequences in order to prevent damage that might be caused to the environment of other States.

The principle not to cause environmental damage to other States and areas beyond its national boundaries constitutes a principle of general and customary international law[38] which forms the basis for State responsibility for environmental damage.[39] This was reflected in Principle 21 of the 1972 Stockholm Declaration and affirmed by Principle 2 of the 1992 Rio Declaration. The latter principle obliges States 'to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of material jurisdiction'.[40] This forms the basis of the principle of prevention in customary international law and determines the scope and extent of its application. In this respect, Sands says:

> 'Closely related to the Principle 21 obligation is the obligation requiring the prevention of damage to the environment, and otherwise to reduce, limit or control activities which might cause or risk such damage. This obligation, sometimes referred to as the 'principle of preventive action' or the 'preventive principle', is distinguishable from Principle 21/Principle 2 in two ways. First, the latter arise from the application of respect for the principle of sovereignty, whereas the preventive principle seeks to minimise environmental damage as an objective in itself. This difference of underlying rationale relates to the second distinction: under the preventive principle, a state may be under an obligation to prevent damage to the environment within its own jurisdiction, including by means of appropriate regulatory, administrative and other measures'.[41]

The principle of prevention was developed and codified by the ILC in its Draft Articles on international liability for damage caused by lawful activities. It was formulated by Quentin-Baxter and further developed by Barboza in their reports submitted to the Commission. In these Draft Articles the Commission adopted a number of articles related to the prevention of accidents and their transboundary harmful effects. These Articles involve procedural obligations which enable the affected States to protect themselves

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[37] YILC, 1994, Vol. II, Part Two, at p. 122, para. 4.
[38] Kiss and Shelton, 2007, at p. 91.
[39] Kummer, 1995, at p. 17; Michael G. Faure & André Nollkaemper, Symposium: Climate Change Risk, Vol. 26A/43A, 2007, pp. 123-179, at p. 144; Verheyen, 2005, at p. 147.
[40] Principle 2 of the 1992 Rio Declaration.
[41] Sands, 2003, at p. 246.

against the risks of nuclear catastrophes.[42] The principle is also embodied in a number of international instruments. According to the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, the continued unreasonable utilisation and operation of an activity violates the principle of equitable and reasonable utilisation.[43] Thus a Watercourse State is prevented from carrying out an activity which could harm the environment in an unreasonable way. Article 21 (2) of this Convention requires the Watercourse State to prevent significant harm to the environment and to harmonize its policies in this respect.[44] This provision contains a general obligation that obliges the Watercourse State to prevent, reduce and control pollution caused by an international watercourse which could cause significant transboundary harm to other Watercourse States or the environment.[45] Similarly, Article 194 (1) of the 1982 UNCLOS contains a number of general obligations which require States, inter alia, to take all the necessary means at their disposal to prevent, reduce and control environmental damage caused by a hazardous activity, to take all the necessary measures to ensure that such activities do not cause environmental damage to other States, and to take all necessary measures to ensure that environmental damage caused by the activities does not spread beyond its territory.[46] Moreover, under the 1992 Biodiversity Convention,[47] the principle expands the protection of the environment to areas beyond the sovereignty of the State. It restricts the sovereign right of the State to exploit its natural resources in accordance with its own environmental policies.[48] Nevertheless,

[42] YILC, 1988, Vol. II, Part Two, at p. 20.
[43] Article 5 of the 1997 Convention on the Law of the Non-Navigational Uses of International Watercourses.
[44] Article 21 (2) of the 1997 UN Convention on Watercourses; YILC, 1994, Vol. II, Part Two, at p. 121.
[45] YILC, 1994, Vol. II, Part Two, p. 122.
[46] Memorial of Ireland, "1982 United Nations Conventions on the Law of the Sea before An Arbitral Tribunal Established under Annex VII: In the Dispute Concerning the MOX Plant, International Movements of Radioactive Materials, and the Protection of the Marine Environment of the Irish Sea", Ireland v. United Kingdom, Vol. I, 26 July 2002, at p. 205.
[47] Article 3 of the 1992 Biodiversity Convention. For the international legal regime of the protection of biological diversity or biodiversity under the conventions of biodiversity see, Karin Baakman, "Testing Times: Effectiveness of Five International Biodiversity-Related Conventions", Wolf Legal Publishers, Nijmegen, the Netherlands, 2011.
[48] Lynne M. Jurgielewicz, "Global Environmental Change and International Law: Prospects for Progress in the Legal Order", University Press in America, Boston, London, 1996, at p. 55.

> 'The principle does not impose an absolute duty to prevent all harm, but rather requires each state to prohibit those activities known to cause significant harm to the environment, such as the dumping of toxic waste into an international lake, and to mitigate harm from lawful activities that may harm the environment, by imposing limits, for example, on the discharges of pollutants into the atmosphere or shared watercourses'.[49]

The principle of prevention has been embodied in a number of non-binding instruments on the protection of the environment. For instance, in 1985, the World Commission on Environment and Development established the Experts Group on Environmental Law to prepare "Legal Principles for Environmental Protection and Sustainable Development" to support States in drafting international instruments on environmental protection and sustainable development.[50] The Expert Group prepared these principles in 1986. Principle 10 sets out the general principle on prevention which requires States to prevent and reduce significant damage to the environment.

In relation to the application of the principle to prevent damage caused by nuclear activities, the principle of prevention is contained in the nuclear instruments. It finds support in the 1959 Antarctic Treaty, which prohibits any nuclear explosions and disposal of nuclear waste in Antarctica.[51] Similarly, the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies prohibits placing objects carrying nuclear arms on or around the moon.[52] The 1963 UN Treaty Banning Nuclear Weapons Tests in

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[49] Kiss and Shelton, 2007, at p. 91.

[50] R. D. Munro and J. G. Lammers, "Environmental Protection and Sustainable Development: Legal Principles and Recommendations", Graham &Trotman/Martinus Nijhoff, Members of the Kluwer Academic Publishers Group, London/Dordrecht/Boston, 1987, at p. 7. See also, Article III of 12 September 1979 Resolution on the Pollution of Rivers and Lakes and international law adopted by the Institute of International Law, Session of Athens, adopted on September 1979. The text of the Resolution is available at: http://www.idi-iil.org/idiE/resolutionsE/1979_ath_02_en.PDF (accessed on 26.4.2012); Article X of the ILA Helsinki Rules on the Uses of the Waters of International Rivers Helsinki, 20 August 1966; Article 3 of the ILA Montreal Rules of International Law Application to Transfrontier Pollution, Montreal 4 September 1982; Article 1 of ILA Montreal Rules on Water Pollution in An International Draining Basin, Montreal 4 September 1982. The text of these instruments is reprinted in Munro and Lammers, 1987.

[51] Article V of the 1959 Antarctic Treaty was adopted in Washington D.C., on 1 December 1959 and entered into force on 23 June 1961, 12 U.S.T. 794, 402 UNTS, 71. The text is also available at: http://www.antarctica.ac.uk/about_antarctica/geopolitical/treaty/update_1959.php (accessed on 28.9.2009); http://www1.umn.edu/humanrts/peace/docs/antarcticnuc.html (accessed on 8.2.2010).

[52] Article 3 (3) of the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, was adopted by the General Assembly of the United Nations on 5 December 1979 and entered into force on 11 July 1984, 18 U.S.T. 2410, 1363,

the Atmosphere, in Outer Space and Under Water was also adopted[53] to show that the parties wanted 'to put an end to the contamination of man's environment by radioactive substances'.[54] This Treaty prohibits and prevents each party from conducting any nuclear weapon test explosion or any other nuclear explosion in any place under its jurisdiction or control if that explosion could cause radioactive debris outside its territory.[55] Nevertheless, not all damage caused to the environment by a nuclear activity is prohibited. A certain level of damage to the environment is allowed. International law allows the discharge of certain levels of radioactive material into the environment. Therefore at present the disposal of low-level radioactive waste at sea is subject to regulation by international organizations.[56] For example, the IAEA has developed scientific standards and guidelines to assist the national authorities of the member States in drawing up regulations for the disposal of radioactive waste at sea. However, there is a broad consensus among States that high level radioactive waste should not be disposed of at sea.[57] The 1972 London Convention on the Prevention of Maritime Pollution by Dumping of Waste and Other Matter, for example, prohibits the disposal of high-level radioactive waste at sea.[58] According to that Convention, '[h]igh-level radioactive wastes or other high-level radioactive matter, defined on public health, biological or other grounds, by the competent international body in this field, at present the International Atomic Energy Agency, is unsuitable for dumping at sea'.[59] In 1996, the Protocol to Amend the London Convention was adopted to prohibit the dumping at sea of any radioactive waste above the permissible level of radioactivity, as defined by the IAEA

U.N.T.S. 3, (1984). The text is also available at: http://www.islandone.org/Treaties/BH766.html (accessed on 28.9.2009); http://www.oosa.unvienna.org/pdf/publications/STSPACE11E.pdf (accessed on 10.2.2012).

[53] Signed in Moscow: August 5, 1963 Ratification advised by U.S. Senate: September 24, 1963 Ratified by U.S. President: October 7, 1963 U.S. ratification deposited at Washington, London, and Moscow: October 10, 1963 Proclaimed by U.S. President: October 10, 1963, entered into force on 10 October 1963. The text of the Treaty is available at: http://www.secureworldfoundation.org/siteadmin/images/files/file_109.pdf (accessed on 8.2.2010); http://www.islandone.org/Treaties/BH454.html (accessed on 8.2.2010).

[54] See the Preamble of the 1963 Treaty Banning Nuclear Weapons Tests.

[55] Article I (1) of the 163 Treaty Banning Nuclear Weapons Tests.

[56] For the international regime and international regulations for dumping and disposal of low-level radioactive waste into the ocean, see, Lasse Ringius, "Radioactive Waste Disposal at Sea: Public Ideas, Transnational Policy Entrepreneurs, and Environmental Regimes", The MIT Press, Cambridge, Massachusetts London, England, 2001.

[57] Pelzer, 1994, at p. 297.

[58] Article IV (I) (a) of the 1972 London Dumping Convention.

[59] Annex I (6) of the 1972 London Dumping Convention.

and adopted by the Contracting Parties.[60] In addition, the Protocol obliges the Contracting Parties to carry out a scientific study every year for a period of 25 years to review the prohibition on dumping low-level radioactive waste at sea.[61] The Protocol allows the Contracting Parties conducting such a study to take into consideration all the factors which they may consider appropriate to review the prohibition on dumping low-level radioactive waste at sea, including political, legal, social and economic considerations.[62] Accordingly there is no State liability under international law for damage caused by a nuclear activity, unless significant damage has been caused to the environment.

Finally, the principle not to cause damage to other States has been applied in international case law. This was reflected in the 1941 Trail Smelter Case between Canada and the USA.[63] In its judgment, the Tribunal stated that:

> 'Under the principles of international law, as well as of the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence'.[64]

This was also affirmed by the ICJ in several decisions relating to transboundary environmental damage. The principle was adopted in the Corfu Channel Case between Britain and Albania in 1949.[65] The ICJ also affirmed the principle of prevention and protection of the environment in its judgment in the case concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia) of 25 September 1997. It recognized the importance of the protection of the environment, not only to a particular State, but also to the whole of mankind.[66] In its advisory opinion of 8 July 1996 on the "Legality of the Threat or Use of Nuclear Weapons" the ICJ recognized the principle of prevention and its importance for the protection of the environment. The advisory opinion states:

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[60] The Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and Resolutions Adopted by the Special Meeting, http://www.org/documents/lc72PROTOCOL.doc

[61] Annex 1 (3) of the 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.

[62] Article 22 (2) of the 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes.

[63] RIAA, Vol. III, p. 1905.

[64] RIAA, Vol. III, p. 1905, at p. 1965; AJIL, Vol. 35, 1941, at p. 716.

[65] ICJ Reports, 1949, at p. 22.

[66] ICJ Reports, 1997, p. 7, at p. 41, para. 53.

> 'The Court recognizes that the environment is under daily threat and that the use of nuclear weapons could constitute a catastrophe for the environment. The Court also recognizes that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment'.[67]

Nevertheless, the Court hesitated to provide a decisive solution to the matter. It stated that there are no provisions in customary and conventional international law that support either the authorization for or the prohibition on the use of nuclear weapons. However, it also stated that such use might be prohibited by the existing rules of international environmental law.[68] Accordingly, the Court did not prohibit the manufacturing or the use of nuclear weapons. In fact, with regard to this sensitive issue, the Court adopted a narrow view and focused only on examining the legal evidence without considering other factors such the harmful consequences resulting from the use of nuclear weapons. The Court missed the opportunity to develop a legal principle focusing on the prohibition of nuclear weapons. It appeared reluctant to be accused of involvement in political matters. Finally, the Court also addressed the principle of prevention in its recent judgment in the Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), 20 April 2010, and reaffirmed the principle as a general principle of international law necessary for the protection of the environment.[69]

4.3.2 Preventive measures

To implement the principle of prevention, the source State is obliged under international law to take the necessary preventive measures to avoid risk and loss or injury likely to be caused by a hazardous activity, and to protect the interests of the affected States.[70] The nuclear liability conventions define the concept of preventive measures as any reasonable measures to be taken by

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[67] ICJ Reports, 1996, p. 226, at pp. 241-242, para. 29.

[68] Hunter, Salzman and Zaelke (eds.), 2007, at p. 504.

[69] The International Court of Justice, Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), 20 April 2010 Judgment, at pp. 56-59, paras. 199-202, available at: http://www.icj-cij.org/docket/files/135/15877.pdf?PHPSESSID=f59011c4e4079882 (accessed on 25.5.2010).

[70] Daniel Barstow Magraw, "International Legal Remedies", in: Günther Handl and Robert E. Lutz, Transferring Hazardous Technologies and Substances: The International Legal Challenge, Graham & Tortman, London/Dordrecht/Boston, pp. 240-267, 1989, at p. 250.

any person to avoid the occurrence of a nuclear accident and to prevent and reduce its harmful consequences.[71] A similar definition is provided by the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment[72] and this is affirmed by the ILC Draft Articles on Prevention of Transboundary Harm.[73] Thus these '[p]reventive measures aim to avoid harm and reduce or eliminate the risk of harm. As such, they concern pollution or other environmental damage that is foreseeable through the normal operations of an activity or the use of a product, as well as measures that should be taken to mitigate or prevent harm in case of accidental damage'.[74] However, the concept of preventive measures under these provisions is still too vague and controversial. This is because there is no precise definition of the concept of preventive measures to determine which measures should be taken, as well as the scope of the measures and who can take them.

As a result, there are two different arguments to determine the scope of application of these preventive measures. The first considers the measures taken after the damage has occurred are not technically have a preventive character, and are only aimed at reducing the damage caused by the hazardous activity. Thus they are considered to be measures of reparation.[75] The second view, which was supported by the Special Rapporteur Barboza, considers that the concept of prevention includes the measures taken to prevent an event before it happens, as well as those taken to reduce the damage caused and minimise the impact.[76] Consequently, preventive measures taken after the accident to prevent or minimize its transboundary harmful effects are preventive measures.[77] As Barboza stated, "preventive measures" means 'any measures intended to prevent or intercept that chain of cause and effect relationships which would prevent or reduce the harmful transboundary effects'.[78] Accordingly, the measures taken to avoid an accident and those

[71] Article I (1) (n) of the Amended Vienna Convention; Article 1 (a) (ix) of the Amended Paris Convention.

[72] Article 2, paragraph 9 of the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment defines "preventive measures" as 'any reasonable measures taken by any person, after an incident has occurred to prevent or minimize loss or damage'.

[73] Article 3 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities provides: 'The State of origin shall take all appropriate measures to prevent significant transboundary harm or at any event to minimize the risk thereof.'

[74] Kiss and Shelton, 1997, at p. 114.

[75] YILC, 1994, Vol. II, Part Two, at p. 154, para. 364.

[76] YILC, 1992, Vol. II, Part Two, at p. 45, para. 301; YILC, 1990, Vol. II, Part Two, A/CN.4/SER.A/1990/Add.1, at p. 91, para. 473.

[77] YILC, 1994, Vol. II, Part Two, at p. 154, para. 364.

[78] YILC, 1994, Vol. II, Part Two, at p. 154, para. 364.

taken after the accident to minimise its harmful consequences are both considered to be preventive measures. This is because an accident could be the result of a series of causes and effects, ultimately leading to transboundary environmental damage.[79] The Special Rapporteur therefore makes a distinction between activities involving risks and those with harmful effects, and interprets the obligation of prevention in two ways. The first includes the measures to be taken before the accident occurs. This concerns activities involving risks. The second includes the measures taken after the accident occurs, to reduce the scope and degree of damage caused by the accident. This concerns activities involving harm.[80]

A similar view was taken with regard to covering the costs of preventive measures under the nuclear liability conventions. These measures are usually taken after the early notification of a nuclear accident by the Accident State and a request for assistance to prevent and reduce damage caused by the accident. They also cover the costs of measures taken to restore the environment to its previous condition. Therefore the measures taken before a nuclear accident are not covered. This led to disagreement about the doctrine of international law with regard to covering the costs of preventive measures taken before a nuclear accident. However, the Conventions cover the costs of preventive measures in the case of an imminent threat of a nuclear accident, if another State or the victims have taken such measures.[81] Therefore the costs of preventive measures taken to prevent a nuclear accident are covered by the conventions.

This view was supported by the doctrine of the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which dealt with the two concepts of preventive measures for the prevention and mitigation of environmental damage caused to the maritime environment. This Convention obliges States to prevent, control, and reduce the damage caused by transboundary pollution in the maritime environment.[82] It provides that:

> 'States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or

[79] YILC, 1994, Vol. II, Part Two, at p. 154, para. 364.
[80] YILC, 1990, Vol. II, Part Two, A/CN.4/SER.A/1990/Add.1, at p. 91, para. 473.
[81] Article 3 (1) of the 1997 Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage, INFCIRC/566, 22 July 1998, available at: http://www.iaea.org/Publications/Documents/Conventions/protamend.html (accessed on 15.6.2010).
[82] 21 ILM 1261 (1982).

> activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention'.[83]

In the MOX Plant Case, Ireland told the International Tribunal for the Law of the Sea (ITLOS), with regard to the application of this Convention to nuclear activities that:

> '[…] the United Kingdom has breached its obligations under Articles 192 and 193 and/or Article 194 and/or Article 207 and/or Articles 211 and 213 of UNCLOS in relation to the authorisation of the MOX plant, including by failing to take the necessary measures to prevent, reduce and control pollution of the marine environment of the Irish Sea from (1) intended discharges of radioactive materials and or wastes from the MOX plant, and/or (2) accidental releases of radioactive materials and/or wastes from the MOX plant and/or international movements associated the MOX plant, and/or (3) releases of radioactive materials and/or wastes from the MOX plant and/or international movements associated the MOX plant with the of resulting from terrorist act […]'.[84]

The obligation of a State to take preventive measures to prevent environmental damage has also been supported by other international instruments.[85] For example, the Convention on the High Seas imposes an obligation upon States to take the necessary measures to prevent pollution and to cooperate

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[83] Article 194 (2) of the 1982 UNCLOS.

[84] The International Tribunal of the Law of the Sea, The MOX Plant Case, (Ireland v. United Kingdom), Request for provisional measures, 3 December 2001, para. 26 (1). The judgment is available at: http://www.itlos.org/start2_en.html

[85] Article 6 of the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution, which was adopted in Barcelona on 16 February 1976 and entered into force on 12 February 1978; Article 22 of the 1997 UN Convention on the Law of Non-Navigational Uses of International Watercourses; Article 1, paragraph 7 of the 29 November 1969 Brussels International Convention on Civil Liability for Oil Pollution Damage, as Amended by the 1976 Protocol. Also, paragraph 6 of the same article defined pollution damage as loss or damage caused outside the ship carrying oil and pollution caused by the escape or discharge of oil from the ship and includes the castes of preventive measures and any further loss or damage caused by preventive measures as a damage, available at: http://www.admiraltylawguide.com/conven/civilpol1969.html (accessed on 23 March 2010); Article 3 (1) of the 1992 Baltic Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992, the text of the Convention is available at: http://www.helcom.fi/stc/files/Convention/Conv0704.pdf (accessed on 25.4.2010); Article 2 (1) of the United Nations: Convention on Environmental Impact Assessment in A Transboundary Context, concluded in Espoo, Finland, February 25, 1991. For the text of the Convention see European Treaty Series, No. 150, Lugano, 21.VI.1993, ILM, Vol. XXX, 1991, at p. 800, also available at: http://conventions.coe.int/treaty/en/Treaties/Word/150.doc (accessed on 27.9.2009).

with the international organizations concerned to implement these measures.[86] There are also a number of international instruments in the field of international civil liability and the environment which support this view.[87]

In short, there is no precise definition of the concept of preventive measures in the general rules of international law, and it is not clear whether that concept applies only to preventive measures taken after an accident or whether it also includes those taken before the accident. We believe that the notion of preventive measures should include measures taken before and after a nuclear accident. This is because according to the rules of international law, the State in whose territory the nuclear activity is located or under whose jurisdiction or control the activity takes place, should issue, for example, the authorization for the activity and should enact legislation before commencing the activity. These are seen as forms of preventive measures. Expanding the concept of preventive measures to cover measures to prevent and minimize the damage is reflected in the increased scope of the State's liability. If the preventive measures cover only measures to reduce damage, then the State is not liable for the costs of other preventive measures.

4.3.3 The principle of due diligence

The principle of due diligence is an old and essential principle in all legal systems. It has its basis in the English common law of tort.[88] It is one of the main elements for achieving the objectives of the duty of prevention and

[86] See Article 25 of the Convention on the High Seas, concluded in Geneva on 29 April 1958, which entered into force on 30 September 1962. United Nations, Treaty Series, Vol. 450, (1963), p. 11, p. 82, available at: http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_1_1958_high_seas.pdf (accessed on 17.2.2010).

[87] In this context, Article 3 paragraph 1 of the Convention on the Transboundary Effects of Industrial Accident stated that '[t]he Parties shall taking into account efforts already made at national and international levels, take appropriate measures and cooperate within the framework of the Convention, to protect human beings and the environment against industrial accidents by preventing such accidents as far as possible, by reducing their frequency and severity and by mitigating their effects. To this end, prevent, preparedness and response measures, including restoration measures, shall be applied'. ILM, Vol. XXXI, 1992, at p. 1333. The Convention was adopted in Helsinki on 17 March 1992, also available at: http://sedac.ciesin.columbia.edu/entri/texts/industrial.accidents.1992.html (accessed on 23.3.2010). Article 2 (1) of the 1991 Espoo Convention obliges the State parties to take, either individually or jointly, 'all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impact from proposed activity'.

[88] Hanqin, 2003, at p. 162.

serves as a basis for State responsibility in international law. In relation to nuclear activities, the principle of due diligence covers the obligation upon the State of origin to make every possible effort to prevent environmental damage caused by nuclear activity. This requires legislative and administrative controls by the State on private and public conduct in order to protect other States and the global environment.[89] In addition, the obligation of prevention requires the State in whose territory or under whose jurisdiction or control a hazardous activity is carried out to exercise due diligence, to act reasonably and in good faith, and to regulate these activities in order to avoid damage to other States and the environment.[90] To assess whether or not a State has complied with the requirement of due diligence, the State's conduct must be assessed in order to find out whether or not it corresponds with the existing rules and standards imposed for that conduct. This entails a comparison of the State's conduct with the average standard of conduct of other States in similar environmental cases.[91] For example, the presence or absence of proper environmental impact assessments carried out by the Installation State can serve as a standard for determining whether or not due diligence has been exercised according to international law. Thus a State is responsible if it fails to ensure that its conduct corresponds with the average due diligence of other States to prevent significant transboundary environmental damage by a nuclear activity.[92] The State is also responsible for exercising due diligence in preventing private persons from violating international obligations.[93]

The principle is supported by international instruments and by the doctrine of international law.[94] According to the 1982 UNCLOS, the State is obliged to take 'all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities […]'.[95] Nevertheless, the standard of due diligence necessary to prevent environmental damage has been criticized. It is argued that the State does not have an absolute obligation of due

[89] Birnie and Boyle, 1992, at p. 92.
[90] Kiss and Shelton, 2007, at p. 91.
[91] Marce Pallemaerts, "International Legal Aspects of Long-Range Transboundary Air Pollution", in: HYIL, Vol. 1, 1988, pp. 189-224, at p. 210; Pierre-Marie Dupuy, "Due Diligence in International Law of Liability", in: NEA, 1977, pp. 369-379, at p. 372.
[92] Kiss and Shelton, 2007, at p. 92.
[93] Smith, 1988, at p. 36.
[94] Okowa, 2000, at p. 79; Birnie and Boyle, 1992, at p. 92; Boyle, BYIL, Vol. 60, 1989, pp.257-313 at p. 272; Barron, CJTL, Vol. 25, 1987, at p. 650.
[95] Article 194 (1) of the 1982 Convention on the Law of the Sea.

diligence. In the Case Concerning the Gabčikovo-Nagymaros Project Hungary claimed that:

> '[T]he duty of prevention is not ... an absolute one, whether the state has fulfilled its obligations in this regard is measured by the rules of due diligence ... In the context of [... this] case, due diligence is the means by which the general principle of the harmful use of territory [... should] be applied taking into account the specific elements of the situation'.[96]

Moreover, this principle does not impose an obligation on the State of origin to achieve specific results. It only imposes the obligation to take reasonable care to prevent damage depending on the particular circumstances in a given case.[97] Thus the standard of care for preventing harm under the duty of due diligence is flexible rather than absolute. Furthermore, the duty of due diligence in customary international law requires effective national legislative and administrative controls. However, this standard is not efficient because the conduct of the States applying it remains undefined. More specific definitions of due diligence are needed, ranging from the best available technology, best practicable means and best management practices to more elaborate definitions.[98] This view was expressed by the Institute of International Law in its Draft Articles on Responsibility and Liability under International Law for Environmental Damage. These Draft Articles provided that '[w]hen due diligence is utilized as a test for engaging responsibility it is appropriate that it be measured in accordance with objective standards relating to the conduct to be expected from a good government and detached from subjectivity. Generally accepted international rules and standards further provide an objective measurement for the due diligence test'.[99]

Thus the duty of due diligence in relation to the prevention of environmental damage caused by nuclear accidents is problematic. This is because the prevention of nuclear accidents requires strict standards of care as far as possible in order to meet the demands of the nuclear industry which involves the most hazardous activities. Nevertheless, nuclear safety standards established by the IAEA are not binding on the States, and only provide guide-

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[96] Counter-Memorial of the Republic of Hungary, Vol. I, para. 6.134, cited in Okowa, 2000, at p. 81.

[97] Ellen Hey, "The Regime for the Exploitation of Transboundary Marine Fisheries Resources", Martinus Nijhoff Publishers, Dordrecht, the Netherlands, 1989, at p. 27.

[98] Ved P. Nanda and Goerge (Rock) Pring, "International Environmental Law for the 21st Century", Transnational Publications, Inc. Ardsley, New York, 2003, at p. 58.

[99] Article 3 of the 1997 Draft Articles on "Responsibility and Liability under International Law for Environmental Damage" drafted by the Institute of International Law.

lines for national safety systems.[100] In addition, the provisions of the 1994 Nuclear Safety Convention and other related instruments are formulated in the form of recommendations, and do not impose specific obligations on the State to prevent nuclear accidents. Similarly, liability for damage caused by such activities requires strict standards of liability. This became apparent after the 1978 Cosmos 954 accident and the Chernobyl accident, which necessitated the reformulation of the existing rules of liability to be more specific and applicable to transboundary environmental damage caused by such accidents.[101]

4.3.4 The precautionary principle

Like most hazardous activities, nuclear activities are usually conducted with caution and using precautionary measures. This is necessary to prevent nuclear accidents and to reduce the harmful consequences if there is an accident. Therefore precautions must be taken by the Installation State as well as by other States likely to be affected by the harmful consequences of a nuclear accident, even before the nuclear activity is carried out. As Wiener pointed out, '[p]recaution is a strategy for addressing risk. Risk of future harm is always uncertain'. Essentially, precaution entails thinking ahead and taking pre-emptive action to avoid uncertain future risks. This necessitates the capacity to identify hazards and opportunities, to predict scenarios and the related outcomes, and to take anticipatory measures against harmful substances.[102] According to Van Dyke, the scenarios and strategies covered by the precautionary principle should include: the assessment of developments and initiatives affecting the environment before an activity is carried out; the establishment of new safe programs and standards; exploring alternative technologies; not limiting precautionary measures to protect the environment in the absence of complete scientific certainty; postponing or cancelling the activity whenever serious or irreversible damage is anticipated.[103]

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[100] Boyle, BYIL, Vol. 60, 1989, at p. 273.

[101] Nathlie Horbach and Pieter Bekker, "The Concept of Sovereignty within Nuclear Energy Law", in: Gerard Kreijen (ed.), "State, Sovereignty, and International Governance", Oxford University Press, Oxford New York, 2002, pp. 427-462, at p. 435.

[102] Jonathan B. Wiener, "Precaution", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 597-612, at p. 598.

[103] Jon M. Van Dyke, "Liability and Compensation for Harm Caused by Nuclear Activities", in: Stockinger, Van Dyke, Geistlinger, Fussek and Machart (eds.), 2007, pp. 205-242, at p. 213.

The precautionary principle is one of the general principles in international law necessary for the protection of the environment.[104] The rules governing this process constitute a principle of customary international law and form the basis of State liability for environmental damage caused by nuclear activities. Because of the urgent need to address the environmental problems that have emerged with the increasing use of hazardous activities, these rules were adopted in several international instruments and have been endorsed by some of the doctrine of international law and judicial bodies as a customary principle of international law. The principle was supported by the Stockholm and Rio Declarations and was included in a number of international instruments. Principle 15 of the Rio Declaration provides that: 'In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'. This principle presumes that the activity will cause serious harmful consequences to the environment, and that this should be prohibited, and

[104] For the precautionary principle in international law see, Arie Trouwborst, "The Precautionary Principle in General International Law: Combating the Babylonian Confusion", in: RECIEL, Vol. 16, Issue 2, 2007, pp. 185-195; Lotta Viikari, "The Environmental Elements in Space Law: Assessing the Present and Charting the Future", Martinus Nijhoff Publishers, Leiden. Boston 2008, at pp. 157-177; Els Reynaers Kini, "The Precautionary Principle, Multilateral Treaties and the Formation of Customary International Law: A Symptom of a Larger Conundrum?" Editions Interuniversitaires Suisses-Edis, Lugano/Brussels/New Delhi, 2008, Arie Trouwborst, "Evolution and Status of the Precautionary Principle in International Law", Kluwer Law International, The Hague, 2002; Simon Marr, "The Precautionary Principle in the Law of the Sea: Modern Decision Making in International Law", Nijhoff Publications on Ocean Development, The Hague 2003; Wybe Theodorus Douma, "The Precautionary Principle: Its Application in International, European and Dutch Law", Proefschrift Rijksuniversiteit Groningen, the Netherlands, 2003; David Freestone and Ellen Hey (eds.), "The Precautionary Principle and International Law: The Challenging of Implementation", Kluwer Law International, The Hague, 1996; Boyle, MP, Vol. 16, No. 1, 1992, pp. 20-35, at p. 22-24; Nicolas de Sadeleer, "Environmental Principles: From Political Slogans to Legal Rules", Oxford University Press, New York, 2002, at pp. 91-229; Philippe Sands, "Environmental Protection in the Twenty-First Century: Sustainable Development and International Law", in: Richard L. Revesz, Philippe Sands and Richard B. Stewart (eds.), Environmental Law, the Economy and Sustainable Development, the United States, the European Union and the International Community, Cambridge University Press, New York, Melbourne, Madrid, 2000, pp. 369-409, at p. 375.

precautions should be taken to reduce risk or injury, even if there is no guarantee that there will be risks or injuries.[105]

The precautionary principle has been adopted in various national and international instruments.[106] For example, it was adopted in the 1992 Maastricht Treaty in Article 130 R (2).[107] It was renumbered as Article 174 and Article 191 (2) in the Lisbon Treaty,[108] and appears in German law, Swedish law and Swiss law. It was also adopted in the 1999 Canadian Environmental Protection Act, the French Environment Charter of 2004, Article 5 and the Preamble of the French Constitution of 2005.[109]

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[105] Jonathan Verschuuren, "Mensenrechten en milieu", at para. 2.1, available at: http://arno.uvt.nl/show.cgi?fid=4974 (accessed on 25.3.2010).

[106] Article 3 (3) of the 1992 UN Framework Convention on Climate Change, which entered into force on 21 March 1994, available at: http://unfccc.int/essential_background/convention/items/2627.php (accessed on 23.3.2010); the 2001 Stockholm Convention on Persistent Organic Pollutants, adopted on 22 May 2001 and entered into force 17 May 2004 (Article 8 (9)), available at: http://www.pops.int/documents/convtext/convtext_en.pdf (accessed on 23.3.2010); Article 2 (5) (a) of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, concluded in Helsinki, on 17 March 1992. The Convention is available at: http://www.unece.org/env/water/pdf/watercon.pdf (accessed on 3.4.2012); Article 2 (2) (a) of the 1992 OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, available at: http://www.ospar.org/html_documents/ospar/html/OSPAR_Convention_e_updated_text_2007.pdf (accessed on 25.4.2010); Article 3 (3) of the 1992 Baltic Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992, available at: http://www.helcom.fi/stc/files/Convention/Conv0704.pdf (accessed on 25.4.2010); Article 2 (4) of the Convention on Cooperation for the Protection and Sustainable Use of the Danube River (Danube River Protection Convention), signed in Sofia on 29 June 1994, available at: http://www.icpdr.org/icpdr-pages/drpc.htm (accessed on 25.4.2010); Article 19 (1) of the Energy Charter Treaty and Related Documents: A Legal Framework for International Energy Cooperation, opened for signature in Lisbon on 17 December 1994 and Corrected by the Protocol of Correction of 1996, entered into force on 16 April 1998. The text of the Treaty is available at: http://www.encharter.org/fileadmin/user_upload/document/EN.pdf (accessed on 17.4.2012).

[107] The Maastricht Treaty, Provisions Amending the Treaty Establishing the European Economic Community with a View to Establishing the European Community, Maastricht, 7 February 1992, available at: http://www.eurotreaties.com/maastrichtec.pdf (accessed on 6.6.2010).

[108] The 2007 Lisbon Treaty, available at: http://www.lisbon-treaty.org/wcm/; the Official Journal of the European Union, C115, vol. 51, 9 May 2008; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:115:0047:0199:EN:PDF (accessed on 15.6.2010).

[109] Wiener, 2007, at pp. 599-601.

The precautionary principle was addressed in certain individual opinions in the Southern Bluefin Tuna Cases (New Zealand v. Japan) (Australia v. Japan) (Request for Provisional Measures, International Tribunal for the Law of the Sea, 27 August 1999).[110] However, in this case, the precautionary principle was not discussed by the Tribunal, and therefore its recognition as a legal principle in international law is questionable. It was considered a precautionary approach and not a precautionary principle.[111] The precautionary principle was discussed by the judges of the ICJ and received recognition, particularly in the Dissenting Opinion of Judge Weeramantry on "Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the *Nuclear Tests* (New Zealand *v.* France)" Order of 22 September 1995.[112] The international courts and tribunals are still reluctant to allow the principle the status of customary international law.[113] This is because the precautionary principle is still a novel principle, which emerged as a result of the increasing use of hazardous activi-

[110] International Law Reports, Vol. 117, 2000, edited by Sir Elihu Lauterpacht, C. J. Greenwood and A. G. Oppenheimer, Grotius Publications, Cambridge University Press, pp. 148-194.

[111] See Separate Opinion by Judge Laing, ILR 117, pp. 169-177, at p. 176, para. 19; Separate Opinion by Judge Ad hoc Shearer, ILR 117, pp. 181-189, at p. 187. Also as Birnie, Boyle and Redgwell pointed out: 'Few commentators regard the difference in terminology as significant, although one view is that the precautionary principle applies in situations of high uncertainty with a risk of irreversible harm entailing high costs, whereas the precautionary approach is more appropriate […] where the level of uncertainty and potential costs are merely significant, and the harm is less likely to be irreversible. However, actual use of the terms and EC law generally refer to the precautionary approach principle, whereas global agreements more often refer to the precautionary approach or precautionary measures.

Nevertheless, the attempt to distinguish the 'approach' from the "principle" points to the reality that the concept of precaution appears to mean different things in different contexts. This is not a subject on which *a* consensus [... can be found]. Much of the confusion surrounding it stems from a failure to distinguish the identification of risk from the entirely separate question of how to respond to that risk. Thus to suggest that states shall 'apply a precautionary approach (or principle) may mean that when faced with scientific uncertainty they must be more cautious about identifying risks, or it may mean that they must act more cautiously by taking measures to deal with those risks. Used in the former sense, the precautionary principle is a sensible development in international environmental law. Used in the latter sense, however, it is not clear whether "precautionary action" or 'precautionary measures' represent a radically new approach to prioritizing environmental protection, or differ only rhetorically from the customary obligation of due diligence codified in Principle 2 of the Rio Declaration and considered earlier'. Birnie, Boyle and Redgwell, 2009, at p. 155.

[112] ICJ Reports, 1995, at pp. 342-344.

[113] Sands, 2003, at p. 279, and 1995 edition, at pp. 212-213.

ties and the ensuing serious environmental problems. This was observed by Judge Wolfrum in his separate opinion in the MOX Plant Case, in which he stated that:

> 'It is still a matter of discussion whether the precautionary principle or the precautionary approach in international environmental law has become part of customary international law. The Tribunal did not speak of the precautionary principle or approach in its Order in the *Southern Bluefin Tuna Cases*. Note should be taken of the fact, though, that the precautionary principle is part of the OSPAR Convention.
>
> This principle or approach applied in international environmental law reflects the necessity of making environment-related decisions in the face of scientific uncertainty about the potential future harm of a particular activity. There is no general agreement as to the consequences which flow from the implementation of this principle other than the fact that the burden of proof concerning the possible impact of a given activity is reversed. A State interested in undertaking or continuing a particular activity has to prove that such activities will not result in any harm, rather than the other side having to prove that it will result in harm'.[114]

In fact, it could be argued that the precautionary principle is an application of the due diligence principle, which imposes an obligation upon the Installation State to take all the necessary care to control a nuclear activity and to ensure that no environmental damage is caused by that activity. There is a great deal of literature which discusses the emergence of the precautionary principle in international law in general.[115] However, like any new legal principle, it is still controversial and disputed by the doctrine of international law, and has not been accepted as a customary or general principle of international law. Furthermore, some authors doubt that the principle has an environmental status. This is because there is scientific uncertainty and the straightforward application of the precautionary principle would have meant that it was impossible to proceed with any activity.[116] But, whether it is called a precautionary principle or precautionary approach, it suggests the creation of a legal principle, which serves as the basis of State responsibility for the protection of the environment. It was argued that the precautionary principle is an attempt to codify the concept of precaution in law in general, and is the most prominent and controversial development in international

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[114] MOX Plant Case (Ireland v. United Kingdom) Provisional Measures, ITLOS, Case No. 10, Order of 3 December 2001, Separate Opinion of Judge Wolfrum, at p. 5. The opinion is available at: http://www.itlos.org/start2_en.html (accessed on 22.8.2009).
[115] Freestone and Hay (eds.), 1996.
[116] ILR, Vol. 117, 2000, at p. 187.

environmental law in the last two decades. Some authors predict that it could become a fundamental principle in policy and law in general for the protection of the environment.[117] Brownlie argues that '[t]he point which stands out is that at least some applications of the precautionary approach, which is based upon the principle of foreseeable risk to other States, are encompassed within existing concepts of State responsibility'.[118] Thus the precautionary principle will be an effective source of State responsibility to ensure that precautionary measures are taken by the State before a nuclear accident to prevent environmental damage caused by nuclear activity.

4.4 The duty of cooperation to control nuclear activity

In general, the principle of cooperation is a principle in international law[119] that is essential to strengthen the social, political and economic relations between States.[120] The principle is particularly important with regard to the use of nuclear energy as a hazardous activity, and the protection of the environment.[121] It is difficult to implement effective measures for the protection of the environment, and no State can protect its own environment without close cooperation with other States. According to this principle, the Installation State must cooperate with other States in good faith, and must provide the relevant information before and during the proposed activity to prevent any environmental damage which could be caused by a nuclear accident. The States are also obliged to cooperate in the event of a nuclear accident, to overcome the harmful consequences of the accident, and to restrict its impact as far as possible. Thus the duty of cooperation has two aims: first, to prevent a nuclear ac-

[117] Wiener, 2007, at p. 599.
[118] Brownlie, 2008, at p. 278.
[119] YILC, 1989, Vol. II, Part Two, at p. 93.
[120] Declaration on Principles of International Law Friendly Relations and Co-operation Among States in Accordance with the Charter of the United Nations which was adopted by the United Nations General Assembly on 24 October 1970. This Declaration states that 'States have the duty to co-operate with one another, irrespective of the differences in their political, economic and social systems, in the various spheres of international relations, in order to maintain international peace and security and to promote international economic stability and progress, the general welfare of nations and international co-operation free from discrimination based on such differences'. The text of the Declaration is available at: http://www.hku.edu/law/conlawhk/conlaw/outline/Outline4/2625.htm (accessed on 31.8.2009).
[121] For the duty to cooperate, see Sands, 1995, at p. 197; Kiss and Shelton, 2004, pp. 28-31; Sands, 2002, at p. 374.

cident, which may cause damage; secondly, to mitigate the harmful effects of an accident.[122]

It is clear that damage caused by a nuclear accident may cross the boundary of the State, and that States must cooperate to develop a regulatory regime aimed at the safe operation of a nuclear facility, and to limit the damage as far as possible. This cooperation is mainly based on providing the relevant information related to the activity. Thus the obligation of cooperation is interrelated with other duties such as notification, consultation and negotiation.[123] Accordingly, the State must cooperate with other States – particularly the neighbouring States – by providing, for example, the relevant information for environmental impact assessments, notifications, consultation and negotiations in order to avoid adverse effects on the environment.[124] This is particularly important because the source State has the right to exercise control not only over activities carried out within its own territory, but also when the activity is conducted under its jurisdiction or control in areas outside its territory. However, the concept of control in international law as used by some lawyers and in some instruments is still vague and ambiguous.[125]

Moreover, it should be noted that the objective of the principle of cooperation is incomplete without reference to the role of international organizations in enhancing the cooperation between States. The main purpose of these organizations is to promote cooperation between States for the purposes for which they were established. They play an essential role in the assistance and coordination between States during construction, operation and in emergency situations to prevent and reduce damage caused by industrial catastrophes.[126] The IAEA, for example, plays an important role in coordination between States, and provides the technical assistance during the construction and operation of a nuclear installation, as well as in the event of a nuclear accident. Thus the source State is required to cooperate with the affected States and other States and international organizations.

The obligation to cooperate to prevent and reduce nuclear damage is based on the existing rules adopted by customary international law, international conventions and decisions of international courts.[127] It is reflected in a number of international instruments related to the protection of the environment. The principle has a soft legal status in the 1972 Stockholm Declaration

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[122] YILC, 1989, Vol. II, Part One, at p. 140.
[123] The duty of notification and exchange of information (Article 11) and duty to consult (Article 11) of the draft articles on international liability for lawful activities.
[124] Boyle, BYIL, Vol. 60, 1989, at p. 279.
[125] Kummer, 1995, at p. 17.
[126] Hashim, 1991, at p. 533.
[127] Van Dyke, 2007, at p. 215.

and the 1992 Rio Declaration on the Environment and Development.[128] According to the Stockholm Declaration:

> 'International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big and small, on an equal footing.
> Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States'.[129]

The principle of cooperation was developed further with the adoption of the 1992 Rio Declaration, which provides not only for cooperation between States to take effective measures for the protection of the environment, but also to develop a national and international regime for liability and compensation for damage caused to the environment.[130] In its session from 9-25 May 1978, the Working Group of Experts of the United Nations Environmental Program[131] also prepared draft principles related to cooperation in the field of the environment where natural resources are shared by two or more States.[132] On 14 November 1974, the Council of the Organisation for Economic Cooperation and Development adopted a Recommendation on Transfrontier Pollution.[133] This recommended that Member States cooperate to develop an international law regime for transfrontier pollution.[134]

The obligation of cooperation between States was further developed in the ILC Draft Articles on international liability for acts not prohibited by international law. In order to elaborate these draft articles, the Special Rapporteur Quentin Baxter proposed a duty of cooperation between States to reduce and prevent the damage caused by industrial catastrophes. States are

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[128] The United Nations Rio Declaration on the Environment and Development. 31 ILM 874 (1992).
[129] Principle 24 of the Stockholm Declaration.
[130] Principle 13 of the 1992 Rio Declaration; See also Principles 7, 9, 10, 12, 18, 19, 24 and 27 of this Declaration.
[131] United Nations Environment Program: Governing Council Approval of the Report of the Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States, Sixth Session of the Governing Council (Cooperation in the Field of the Environment Concerning Natural Resources Shared by Two or More States, Nairobi, 9-25 May 1978, GC 6/CRP.2, 19 May 1978, ILM, 17, 1978, p. 1091.
[132] ILM, 17, 1978, p. 1097.
[133] ILM, 14, 1975, p. 242.
[134] See paragraph III of the OECD "Recommendation of the Council on Principles Concerning Transfrontier Pollution", Paris, 14 November 1974, available at: http://www.fao.org/docrep/005/w9549e/w9549e06.htm (accessed on 5.6.2010).

required to cooperate with each other to control the transboundary effects resulting from industrial catastrophes, which cause damage to people, property and the environment. This was reflected in Article 7 of these Articles, which provides for the cooperation between States in good faith, in order to prevent and reduce damage caused by such activities. They must endeavour to minimise the effects as soon as possible. The Principle was affirmed by the ILC Draft Articles on preventing transboundary harm, which state that 'States concerned shall cooperate in good faith and, as necessary, seek the assistance of one or more competent international organizations in preventing significant transboundary harm or at any event in minimizing the risk thereof.'[135] This duty was also reflected in the ILC's codification of the law of international watercourses.[136] Article 8 of the Draft Articles on the Law of Non-Navigational Uses of International Watercourses provides that 'watercourse states shall cooperate on the basis of sovereign equality, territorial integrity and mutual benefit in order to attain optimum utilisation and adequate protection of an international watercourse'.[137] The duty of cooperation has certainly been successfully applied in the field of international watercourses.[138]

The duty of cooperation is also reflected in international practice.[139] For example, it was adopted in Article 3 of the Charter of Economic Rights and Duties of States,[140] and in Article 197 of the 1982 UNCLOS. Moreover, after the Chernobyl accident, the principle was adopted by the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. This Convention imposes a general duty on the Contracting States to cooperate with each other and with the IAEA to facilitate prompt assistance in the event of a nuclear accident or radiological emergency.[141] The 1992 Conven-

[135] Article 4 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.
[136] See the draft articles in the UN Doc. A/43/10, Report of International Law Commission to the General Assembly, 1988.
[137] See UN Doc. A/CN L.463/Add.4, 1993.
[138] Maria Manuela Farrajota, "Notification and Consultation in the Law Applicable to International Watercourses", in: L. Boisson De Chazournes and S.M.A. Salman (eds.), Les ressources en eau et le droit international (Water Resources and International Law), Hague Academy of International Law, Martinus Nijhoff Publishers, Leiden/Boston 2005, pp. 281-339, at p. 335.
[139] Boyle, BYBIL, Vol. 60, 1989, at p. 278.
[140] Resolution adopted by the General Assembly 3281 (XXIX). Charter of Economic Rights and Duties of States, UN General Assembly, 2315th plenary meeting, 12 December 1974, UN Doc. A/RES/29/3281, available at: http://www.un-documents.net/a29r3281.htm (accessed on 4.4.2012).
[141] ILM, Vol. 25, 1986, at p. 1369.

tion on the Transboundary Effects of Industrial Accidents is aimed at the protection of people and the environment from industrial accidents by means of preventive measures to prevent industrial accidents, and by providing the necessary information and response to accidents in order to reduce the harmful impact of such accidents, including the impact of accidents caused by natural disasters. It also provides for international cooperation and mutual assistance, research and development, exchange of information and technology to prevent accidents caused by industrial technology.[142]

The principle of cooperation was also reflected in a number of bilateral agreements dealing with nuclear installations. These agreements require the full exchange of information between the Installation State and other States on the proposed nuclear installation, so that these States can review the decision-making process, and provide data and comments on safety and protecting human health, and on the rules protecting the environment.[143] In general, a number of bilateral agreements between States were concluded on the operation of nuclear installations on the issues related to liability, radiation protection and safety of nuclear installations. The basic principles of these agreements are quite similar to those provided by multilateral nuclear agreements and national laws.[144]

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[142] The Convention on the Transboundary Effects of Industrial Accidents was adopted on 17 March 1992 in Helsinki, available at: http://www.unece.org/env/documents/2006/teia/Convention%20E.pdf (accessed on 25.01.2010); Article 14 of this Convention which was Article 18 of the draft of the Convention; YILC, 1991, Vol. I, at p. 114, para. 3; Article 13 of the 1992 Convention on the Transboundary Effects of Industrial Accidents of 17 May 1992, entered into force on 19 April 2000, 2105 UNTS 457, (2000); Article 9 of the Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution, signed in Barcelona on 16 February 1976, and entered into force on 12 February 1978, 15, ILM, 1976, 290 (revised in Barcelona, Spain, on 10 June 1995 as the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, available at: http://www.unep.ch/regionalseas/regions/med/t_barcel.htm (accessed on 18.4.2012).

[143] Alan E. Boyle, "The Principle of Co-operation: The Environment", in: Colin Warbrick and Vaughan Lowe (eds.), The United Nations and the Principles of International Law, Essays in Memory of Michael Akehurst, Taylor & Francis, London, New York, 2002, pp. 120-136, at p. 124.

[144] In general, see State Practice Survey on "International Liability for Injuries and Consequences Arising Out of Acts Not Prohibited by International Law", Study prepared by the Secretariat, United Nations, General Assembly, A/CN.4/384, 1984; Hardy, ICLQ, Vol. 10, 1961, at p. 739; Alley Allan, "Atomic Energy and World Trade", in: Vand.LR, Vol. 12, 1958, pp. 51-80; Harry Street and F. R. Frame, "Law Relating to Nuclear Energy", Butter Worths, 1966, pp. 199-200; IAEA, "Bilateral, Regional and Multilateral Agreements Relating to Co-operation in the Field of Nuclear Safety", Legal Series No. 15, 1990; Lefeber, 1996, at p. 241.

A number of agreements were concluded between neighbouring countries on the operation of nuclear power plants. Some of these agreements were adopted with an exchange of letters. For example, the agreement between Belgium and France on Radiological Protection for the Operation of the Ardennes Nuclear Power Station in French territory near the Belgian border was signed on 23 September 1966.[145] The agreement between Denmark and the Federal Republic of Germany for the exchange of information regarding the construction of nuclear installations along the border was signed on 4 July 1977.[146] There was an exchange of letters on 16 July 1976 between France and the Union of Soviet Socialist Republics on the prevention of the accidental or unauthorised use of nuclear weapons that might cause injuries to the other Contracting Party.[147] The agreement between Germany and Switzerland for the reciprocal provision of information concerning the construction and operation of nuclear installations in frontier areas was signed in Bonn on 10 August 1982.[148] Although these agreements are not directly relevant to the question of liability, they contain obligations for the States parties to observe international standards of safety for the construction and operation of nuclear power plants. States would be subject to international liability in the case of a breach of these obligations.

The duty of cooperation was affirmed in the Lake Lanoux arbitration between France and Spain in 1957.[149] It was applied by the ITLOS in the case concerning the MOX Plant, which was been brought by Ireland against the United Kingdom in 2001. Ireland requested the Tribunal to order provisional measures to oblige the UK to suspend the authorization of the MOX Plant, and to take the necessary measures to prevent its operation of the plant, and to ensure that there was no movement by water of radioactive substances or material or waste into or out of its sovereign territory.[150] Accordingly, the Tribunal ordered the two States to cooperate and to consult on this matter for that purpose. The judgement stated:

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[145] UNTS, Vol. 588, 1967, p. 227.

[146] ILM, 1978, Vol. 17, No. 1, pp. 274-276.

[147] Exchange of Letters Constituting an Agreement between France and the Union of Soviet Socialist Republics Concerning the Prevention of the Accidental or Unauthorised Use of Nuclear Weapons, Moscow, concluded and entered into force 16 July 1976. UNTS, Vol. 1036, 1977, p. 299.

[148] UNTS, Vol. 1387, p. 279.

[149] PCIJ, Series A/B, No. 42, p. 103.

[150] The International Tribunal of the Law of the Sea, The MOX Plant Case, (Ireland v. United Kingdom), Request for provisional measures, 3 December 2001, para. 29. The judgment is available at: http://www.itlos.org/start2_en.html (accessed on 5.6.2010).

> 'Ireland and the United Kingdom shall cooperate and shall, for this purpose, enter into consultations forthwith in order to: (a) exchange further information with regard to possible consequences for the Irish Sea arising out of the commissioning of the MOX plant; monitor risks or the effects of the operation of the MOX plant for the Irish Sea; devise, as appropriate, measures to prevent pollution of the marine environment which might result from the operation of the MOX plant'.[151]

The same Tribunal pronounced a similar judgement in the Case Concerning Land Reclamation by Singapore in and Around the Straits of Johor. In its judgment, the Tribunal ordered the two parties to consult and cooperate to take appropriate measures to deal with the adverse effects resulting from land reclamation.[152]

In conclusion, the Installation State must cooperate with other States which are likely to be affected by a nuclear activity, particularly with the neighbouring States and the competent organizations to prevent damage caused by such installations, and to provide assistance in the event of a nuclear accident. This cooperation must be pursued during the different phases of the nuclear activity both before and during the activity, and in the event of a nuclear accident. The cooperation may take different forms, including providing the relevant information about the proposed activity, environmental impact assessments, the exchange of information, providing information to the public, consultation, notifying other States in the event of a nuclear accident and providing assistance in the event of a nuclear accident. The cooperation on these issues is aimed at controlling the activity, and preventing environmental damage to other States. This requires close cooperation between the source State, the States likely to be affected by the activity and the international organizations concerned.

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[151] The International Tribunal of the Law of the Sea, The MOX Plant Case, 3 December 2001, para. 89.

[152] The Tribunal stated: 'Malaysia and Singapore shall cooperate and shall, for this purpose, enter into consultations forthwith in order to: (a) establish promptly a group of independent experts with the mandate (i) to conduct a study, on terms of reference to be agreed by Malaysia and Singapore, to determine, within a period not exceeding one year from the date of this Order, the effects of Singapore's land reclamation and to propose, as appropriate, measures to deal with any adverse effects of such land reclamation; (ii) to prepare, as soon as possible, an interim report on the subject of infilling works in Area D at Pulau Tekong; (b) exchange, on a regular basis, information on, and assess risks or effects of, Singapore's land reclamation works'. The Case Concerning Land Reclamation by Singapore in and Around the Straits of Johor, (Malaysia v. Singapore), 8 October 2003 Order, para. 106. This judgment is available at: http://www.itlos.org/start2_en.html (accessed on 19.8.2009).

4.5 Conclusions

This chapter investigated the legal basis of the principle of prevention as an essential principle of international law which is necessary when nuclear activities are conducted to prevent and reduce damage caused by a nuclear accident. The investigation concludes that the principle of prevention is a fundamental principle which has emerged in the corpus of contemporary international law. It is aimed at the prevention and reduction of environmental damage by a hazardous activity. The principle is a general principle in international law that can apply to environmental damage caused not only by nuclear activities, but also by other hazardous activities in general. In addition, there is evidence in international law that the principle of prevention has become a principle of customary international law. Moreover, the principle of prevention is based on cooperation between States to meet the numerous general and procedural obligations which are necessary to ensure the safe operation of a nuclear installation. These obligations constitute the core of the principle of prevention and should be fulfilled by the Installation State and other States to prevent and reduce environmental damage caused by a nuclear activity. Some of these principles emerged in international law a long time ago, e.g., the principle of due diligence, while others developed recently, e.g., the precautionary principle. These principles form the fundamental obligations which constitute the basis of the obligation of prevention, and are considered by some authors to form the basis for liability under international law in general, and for environmental damage in particular. However, some of these principles are not accepted as customary international law, for example, the precautionary principle. These general conclusions lead to some other conclusions.

First, with regard to the principle of prevention, there are two main procedural duties on any State conducting a nuclear activity. These include the duties of the Installation State to control the nuclear activity and not to cause environmental damage to other States, and to cooperate with States likely to be affected by the activity and with international organizations. Control of the activity by the Installation State and close cooperation with States likely to be affected by the activity are necessary to avoid the occurrence of nuclear accidents and to prevent and reduce their harmful consequences. Therefore, the principle of cooperation between States is required for the principle of prevention to be effective in preventing a nuclear accident.

Secondly, these obligations form the content of the general obligation of prevention under international law to prevent and reduce environmental damage caused by a nuclear accident. This general obligation requires the Installation State to take precautionary measures, observe due diligence and

take preventive measures to prevent and reduce damage caused by a nuclear accident. However, a distinction has been made between the obligation of prevention and the obligation to reduce the harmful consequences. The obligation of prevention obliges the Source State to take the necessary measures to prevent a nuclear accident as well as its harmful consequences. This means that under the principle of prevention, preventive measures must be taken before and after a nuclear accident. However, the obligation of reduction only obliges the source State to take the necessary measures to reduce the consequences after a nuclear accident. In other words, the principle of prevention applies in the event of new environmental damage caused by a hazardous activity, while the principle of reduction applies to reduce the existing damage caused by the activity.

Thirdly, the State is not allowed to carry out nuclear activities without observing due diligence or due care. In general, the principle of due diligence requires the State to impose legislative and administrative measures on private and public activities within its territory or under its jurisdiction or control. The State has to exercise due diligence, to act reasonably and in good faith, and to regulate such activities in order to avoid damage to other States and the environment. Assessing whether or not a State has complied with the requirement of due diligence is subject to a comparison of its conduct with the conduct of other States in similar environmental cases. Thus the principle is based on a comparison of the State's conduct with the average conduct of other States. The failure of a State to meet this standard, based on the existing legislation and regulations, constitutes State responsibility. Nevertheless, the prevention of a nuclear accident under the principle is not absolute because the duty of due diligence is not absolute. The principle does not impose an obligation upon the Installation State to achieve certain results. It only obliges it to take reasonable care to prevent a nuclear accident depending on the particular circumstances. In addition, the nuclear safety standards established by the IAEA in the existing instruments for the safety of nuclear installations are formulated in the form of recommendations. Thus the due diligence doctrine does not meet the requirements of nuclear energy, which needs strict standards and rules that can prevent nuclear accidents.

Finally, the application of the precautionary principle is important to prevent environmental damage caused by nuclear activities. However, the status of the principle is still disputed. The precautionary principle is not considered a general principle or approach. The principle recently emerged and is still controversial as a principle of customary international law. It is based on the fact that the State must take all possible preventive measures to prevent a nuclear accident. The failure of a State to take such measures constitutes State responsibility. Therefore the precautionary principle is an application

of the principle of due diligence, which is considered as a general principle applicable in different cases. The precautionary principle is an efficient principle for the protection of the environment, and has emerged as a legal principle forming the basis of State responsibility for environmental damage caused by hazardous activities in general and by nuclear activities in particular.

5 THE PROCEDURAL RULES AND OBLIGATIONS UNDER INTERNATIONAL LAW FOR CONSTRUCTION OF A NUCLEAR INSTALLATION: IMPLEMENTATION OF THE OBLIGATION OF PREVENTION AND REDUCTION OF ENVIRONMENTAL DAMAGE

5.1 Introduction

The protection of people and the environment from the hazards arising from nuclear power plants has been a matter of great concern since the very beginning of the use of nuclear reactors.[1] Therefore the construction and opera-

[1] At the beginning of the use of nuclear energy for peaceful uses, academic circles and institutions debated the rules of law necessary for the protection of people, property, and the environment from the hazards arising out of the use of nuclear energy and the development of the nuclear industry. See, the First International Conference on the Peaceful Uses of Atomic Energy, held in Geneva, August 8–21, in 1955, Paul C. Szasz, "Law and Practice of the International Atomic Energy Agency", Legal Series No. 7, IAEA, Vienna, 1970, pp. 281-283; Summer Institute on International and Comparative Law, University of Michigan Law School, "Workshops on Legal Problems of Atomic Energy", held at University of Michigan Law School, September 13-September 15, 1956, foreword by E. Blythe Stason, Ann Arbor, Michigan, University of Michigan Law School, 1956, p. v; E. Blythe Stason, Samuel D. Ester and William J. Pierce, "Atoms and the Law", Ann Arbor, The University of Michigan Law School, 1959, p. 1362; Herbert S. Marks (ed.), "Law and Administration" volume 1, Progress in Nuclear Energy, Series X, Pergamon Press, London. New York. Paris. Los Angles, 1959; Jaro Mayda (ed.), "Atomic Energy and Law: International Symposium", Record of the International Symposium on legal and administrative problems connected with peaceful atomic energy programs, San Juan, Puerto Rico 16-19 November 1959, School of Law University of Puerto Rico, Rio Piedras, 1960, at pp. v-vii; EURATOM, "Legal and Administrative Problems of Protection in the Peaceful Uses of Atomic Energy", Proceedings of the International Symposium held in Brussels from 5 to 8 September 1960, EURATOM Brussels, June 1961, p. 761; International Association of Democratic Lawyers , "Legal Problems Arising from the Development and Utilization of Atomic Energy", Proceedings of the Second Commission, VIIth Congress of the International Association of Democratic Lawyers-Sofia 10th-14th October 1960, Publications of the International Association of Democratic Lawyers, 234, rue du Trône, Brussels 5, Belgium, 1960, pp. 7-8; Weinstein (ed.), 1962, pp. ix-x; Albert J. Rosenthal, Harold L. Korn & Stanley B. Lubman, "Catastrophic Accidents in

tion of nuclear power plants have always been subject to strict conditions and procedures to ensure their safe operation.[2] To prevent potential transboundary environmental damage resulting from these installations, international law prescribes that certain procedures be performed by the Installation State with the cooperation of affected States and the international organizations concerned prior to the construction, during the operation, and after the termination of a nuclear reactor installation.[3] Though consistent with the rules of international law, the procedural obligations are determined by State authorities in accordance with national law and are implemented by the operating body and competent authorities.[4]

Accordingly, the Installation State must establish a comprehensive regulatory regime to organize and to ensure the safe operation of nuclear installa-

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Government Programs", Legislative Drafting Research Fund, Columbia University, National Security Industrial Association, Library of Congress Card Number, 63-23428, Washington, D.C., 1963, pp. 1-3; Edward J. Bloustein (ed.), "Nuclear Energy, Public Policy and the Law: With an Appendix of Statutory and Administrative Materials" Published for New York University School of Law by Oceana Publications, Inc. Dobbs Ferry, New York 1964, pp. iii-iv; Laurie R. Rockett, et al., "Financial Protection Against Nuclear Hazards: Thirty Years' Experience Under the Price-Anderson Act", 1964, pp. 1-2, 7-8; Harry Street and F. R. Frame, "Law Relating to Nuclear Energy", London Butter Worths, 1966, pp. v-vi.

[2] See, "Safety Criteria for Siting A Nuclear Power Plant" Regulations Issued by the Finland Radiation and Nuclear Safety Authority (STUK) for the safe use of nuclear energy and to physical protection, emergency preparedness and safeguards according to the Finland acts and regulations, 11 July 2000 GUIDE, YVL 1.10. This Guide is in force as on 1 January 2001, Helsinki 2001, available at: http://www.finlex.fi/pdf/normit/6143-YVL1-10e.pdf (accessed on 21.2.2012); "Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations", U.S. Nuclear Regulatory Commission, Regulatory Guide, Office of Nuclear Regulatory Research, April 1998, available at: http://www.orau.org/PTP/PTP%20Library/library/Nrc/Reguide/04-007.PDF (accessed on 21-2-2012); Occupational Radiological Protection: Principles and Criteria for Designing New Nuclear Power Plants", OECE/Nuclear Energy Agency 2010, p. 3, available at: http://www.nea.fr/rp/reports/2010/nea6407-occupational-rp.pdf (accessed on 21.2.2012).

[3] Such procedures must be maintained and implemented by the State at the time of authorization and while the activity is in progress or in case of a nuclear accident. The State should take preventive measures during planning, construction, operation, and decommissioning of a nuclear reactor installation. For instance, safety assessments of a nuclear facility must be continually implemented by the State throughout the lifetime of the facility. See Tromans and FitzGerald, 1997, at p. 72.

[4] OECD/NEA, "Nuclear Legislation in OECD Countries: Regulatory and Institutional Framework for Nuclear Energy, United Kingdom", OECD Paris 2003, available at: http://www.nea.fr/law/legislation/united-kingdom.pdf (accessed on 19.2. 2012); Legislation for other OECD Countries, available at: http://www.nea.fr/law/legislation/ (accessed on 19.2.2012).

tions[5] and liability for nuclear damage caused by such installations.[6] It should also determine the person responsible for the operation and implementation of the relevant safety standards[7] and design a regulatory body to regulate and ensure the implementation of the legislative and regulatory regime.[8] The Installation State must also select the suitable site for the plant;[9] conduct environmental impact assessments before authorizing or licensing the construction of the plant;[10] and ensure that the design, construction,[11] and operation of the installation are performed in accordance with rigorous safety requirements.[12] Moreover, it should inform and provide all relevant and available information to the public and the States likely to be affected by the activity.[13] Finally, the Installation State is obliged to enter into consultation and negotiations at its own request, the request of the affected States, or both, and to cooperate to prevent and reduce damage caused by a nuclear catastrophe.[14] These are general obligations of international law that also apply to other hazardous activities.[15] They comprise the obligation of prevention in international law and focus on the regulation of the activity and the obligation of a State to provide the relevant information about an activity to States likely to be affected so as to prevent and reduce potential damage.[16] Thus cooperation between States is an essential requirement in international law to implement these procedural obligations.[17]

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[5] Article 7 of the 1994 Convention on Nuclear Safety, June 17, 1994, S. Treaty Doc. No. 104-6, 1995, UNTS, Vol. 293, 33 ILM 1518 (1994), available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/inf449.shtml.

[6] OECD/NEA, "Nuclear Legislation in Central and Eastern Europe and the NIS: Overview", OECD Paris 2003, available at: http://www.nea.fr/law/legislation/nea4268-eastern.pdf (accessed on 19.2.2012).

[7] Article 9 of the 1994 Nuclear Safety Convention.

[8] Article 8 of the 1994 Nuclear Safety Convention.

[9] Article 17 of the 1994 Nuclear Safety Convention.

[10] Article 14 of the 1994 Nuclear Safety Convention.

[11] Article 18 of the 1994 Nuclear Safety Convention.

[12] Article 19 of the 1994 Nuclear Safety Convention.

[13] Amidou Garane, "Notification et consultation en droit des cours déaux internationaux", in: L. Boisson De Chazournes and S. M. A. Salman (eds.) Les ressoures en eau et le droit international (Water Resources and International Law), Hague Academy of International Law, Martinus Nijhoff Publishers, Leiden/Boston, 2005, pp. 241-280, at pp. 248-249.

[14] Farrajota, 2005, at p. 296.

[15] See generally, Veronica A. Santos, "The International Liability for Hazardous Exports", in: PLJ, Vol. 61, 1986, pp. 349-362, at p. 355.

[16] Boyle, MP, Vol. 16, No. 1, 1992, at pp. 20-22.

[17] See Article 4 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, *See* Report of the International Law Commission to the Gen-

These procedural obligations are considered to be customary and general principles of international law.[18] They were embodied in the ILC Draft Articles on Prevention of Transboundary Harm and Principles of International Liability.[19] They must be fulfilled in good faith by the Source State, the affected States, other States, and the international organizations concerned.[20] The obligation of good faith is itself a fundamental principle of international law included in the *pacta sunt servanda* to ensure the fulfillment of treaty objectives.[21] The violation of these obligations generates State responsibility for wrongful acts under the general rules of international law.[22] According to Article 12 of the ILC 2001 Draft Articles on State Responsibility, '[t]here is a breach of an international obligation by a State when an act of that State is not in conformity with what is required of it by that obligation, regardless of

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eral Assembly, U.N. Doc A/56/10; GOAR, 56 Sess., Supp. No. 10 (2001), *reprinted in* YILC, 2001, Vol. II, Part Two, at p. 146 and with commentaries, p. 148, Article 4, p. 155, U.N. Doc. A/CN.4/SER.A/2001/Add.1 (Part 2); Articles 5 (2) and 8 of the 1997 United Nations Convention on the Law of the Non-Navigation Uses of International Watercourses, General Assembly Resolution 51/229, Annex, Official Records of the General Assembly, Fifty-first Session, Supplement No. 49 (A/51/49), 21 May 1997; Principle 24 of the 1972 Stockholm Declaration and Principle 7 of the 1992 Rio Declaration.

[18] For customary and general international law principles, see Kiss and Shelton, 2004, pp. 175-223; Rosemary Rayfuse, "International Environmental Law", in: Sam Blay, Ryszard Piotrowicz, and B. Martin Tsamenyi (eds.), Public International Law: An Australian Perspective, Second Edition, Oxford University Press, Melbourne-Oxford-Auckland-New York, 2005, pp. 354-378, at pp. 358-362, see also 1997 edition, pp. 355-381, at pp. 364-365.

[19] The 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, available at: http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_7_2001.pdf (accessed on 25.2.2012).

[20] See Article 4 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm; Article 8 (1) of the 1997 Convention of International Watercourses.

[21] Articles 26 of the 1969 Vienna Convention on the Law of Treaties, concluded at Vienna on 23 May 1969, entered into force on 27 January 1980,S. TREATY DOC. No. 92-12, 1155 U.N.T.S. 331, (1980), available also at: http://untreaty.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf (accessed on 2.9.2009); Guy S. Goodwin-Gill, "State Responsibility and the 'Good Faith' Obligation in International Law", in: Malgosia Fitzmaurice and Dan Sarooshi (eds.), Issues of State Responsibility before International Judicial Institutions, Hart Publishing, Oxford and Portland Oregon, England, 2004, pp. 75-104, at p. 90.

[22] A. E. Boyle, "Globalizing Environmental Liability: The Interplay of National and International Law", in: JEL, Vol. 17, No. 1, 2005, pp. 3-26, at p. 3. See generally, Crawford, Pellet and Olleson (eds.), 2010, (Discussing international law of State responsibility with a special focus on the work of the ILC).

its origin or character'.[23] Thus, State responsibility is a means to ensure the fulfillment of international obligations by States.[24]

These procedural obligations play an important part in determining the content of a State's due diligence obligation to ensure the safe operation of a nuclear installation. For example, if a State has failed to conduct an environmental impact assessment or to notify the public and allow it to participate in the decision-making process, it cannot claim that it has effectively fulfilled its obligations and the broader duty of due diligence.[25] This chapter seeks to thoroughly investigate these obligations and to clarify their application in practice. It has been argued that:

> '[V]ery little explicit attention has been paid to the legal implications of these obligations. A systematic treatment of this subject is omitted in most of the major works. In particular, the precise method of complying with the obligations in treaty instruments, as well as the legal consequences of non-compliance, remain unclear... For instance, the construction of a nuclear reactor, as the Chernobyl accident graphically demonstrates, could affect the territories of most States however far removed from the scene of an accident... Yet, it remains unclear which States are entitled to notification or consultation when nuclear installations are proposed or when accidents occur'.[26]

Therefore the examination of these obligations has become an urgent matter in this study.

Because these procedural obligations are mainly based on conventional law, the examination of these obligations is based on existing provisions of nuclear conventions and other provisions in international instruments related to the environment. They can be examined in three phases, viz. the procedural obligations of the Installation State before the operation of a nuclear installation, its obligations during the operation of a nuclear installation, and its obligations in the event of a nuclear accident. However, this chapter examines them from another perspective: Section 5.2 examines pre-accident obligations while Section 5.3 examines post-accident obligations. This is because the obligation of prevention does not distinguish between the obligations of the State before and during the operation of a nuclear installation, while one can easily distinguish between the pre-accident obligations (i.e.,

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[23] Report of the International Law Commission on the work of its fifty-third session (23 April–1 June and 2 July–10 August 2001), DOC. A/56/10, Article 12, the 2001 Draft Articles on the Responsibility of States for Internationally Wrongful Acts, with commentaries, U.N. Doc A/56/10 (2001).

[24] Graefrath, RDC, Vol. 185, Part II, 1984, at p. 19.

[25] Okowa, 2000, at p. 97.

[26] Phoebe N. Okowa, "Procedural Obligations in International Environmental Agreements", in: BYIL, Vol. 57, 1996, pp. 275-335, at p. 276.

the duty of a State to control a nuclear activity) and post-accident obligations (i.e., notification and assistance in case of a nuclear accident).[27] For example, the obligation to authorize a nuclear installation is a pre-operation obligation, while the obligation for an environmental impact assessment to be carried out by the Installation State may apply both before the construction of a nuclear installation and during its operation. Thus, both are more aptly characterized as pre-accident obligations. However, the obligations to make early notification and to provide prompt assistance have to be fulfilled by the States after a nuclear accident occurs and are characterized as post-accident obligations.

5.2 Pre-accident obligations: The duty of a State to control a nuclear activity

This section examines certain procedural rules and obligations that must be fulfilled by the Installation State, potentially affected States, and the international organizations concerned in order to control nuclear activity to prevent and reduce damage to people and the environment.[28] These obligations are pre-nuclear accident obligations, which apply before the operation of a nuclear installation, during the preparation and construction, and during the operation by the Installation State; they apply before the occurrence of a nuclear accident. These obligations include: establishing a legislative and regulatory regime to organize the operation of a nuclear installation; carrying out an environmental impact assessment to ensure that the activity does not have a harmful impact on the environment; designating the operating body responsible for the operation of the installation; providing prior authorization to the operating body that determines the required conditions for the safe operation of a nuclear installation; taking care of nuclear reactor installation safety; and inspecting the application of these rules.[29] These obligations concern the sources of information to be provided by the Installation State to other States and the international organizations concerned.[30]

An Installation State, therefore, is obliged to provide potentially affected States and international organizations concerned with the relevant informa-

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[27] Sands, 1988, at pp. 34-40; Katia Boustany, "Chernobyl: Law and Communication by Philippe Sands, Grotius Publications Limited, Cambridge UK, 1988", Book Review, in: CYIL, Vol. 27, 1989, pp. 497-501, at p. 501.

[28] For procedural principle in international environmental law see, Nanda and Pring, 2003, pp. 43-62.

[29] David A. Wirth, "Hazardous Substances and Activities", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 394-422, at p. 417.

[30] Sands, 2003, pp. 827-868.

tion necessary to avoid environmentally harmful consequences that might be caused by such installations.[31] It is obliged to give them prior notification before the construction of an installation and to consult, negotiate, and exchange information with them in order to establish a mechanism that guarantees the safe operation of the installation.[32] It must also provide the public with the relevant information with which to ensure the safe operation of the installation.[33] These obligations, respectively, will be subject to examination in this Section in two parts. Section 5.2.1 deals with the procedural obligations and rules that are mainly performed by the Installation State to ensure the safe operation of a nuclear installation. Section 5.2.2 addresses the obligations required for cooperation between the Installation State and the affected States in providing the necessary information to prevent environmental damage caused by a nuclear installation.

5.2.1 Obligations of the State to ensure the safe operation of a nuclear installation

This Section deals with the procedural obligations of the Installation State to maintain the safe operation of a nuclear installation in five subsections, respectively: the establishment of a legislative and regulatory regime in Section 5.2.1.1, designation of the person who is liable for the operation in Section 5.2.1.2, environmental impact assessment in Section 5.2.1.3, prior authorization in Section 5.2.1.4, and the care of nuclear reactor installation safety in Section 5.2.1.5.

5.2.1.1 The establishment of a legislative and regulatory regime

One of the basic requirements for conducting hazardous activities is that the Installation State must establish a regulatory framework to organize the operation of the proposed activity that meets international standards and obligations.[34] According to the 2001 ILC Draft Articles on Prevention of Trans-

[31] These obligations have been embodied in different instruments of international law. See, e.g., Article 8 of the 2001 Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.

[32] Jon M. Van Dyke "The Legal Regime Governing Sea Transport of Ultra-hazardous Radioactive Materials", in: ODIL, Vol. 33, 2002, pp. 77-108, at pp. 84-86, available at: http://www.hawaii.edu/elp/publications/faculty/JVD/Ultrahazardous_Radioactive_Materials.pdf (accessed on 12.10.2010).

[33] *See* Jonas Ebbesson, "Public Participation", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 681-703, at pp. 698-699.

[34] Article 5 of the 2001 Draft Articles on Prevention of Transboundary Harm for Hazardous Activities. The Installations State conducting a nuclear activity usually creates nuclear legislation to organize the operation of the activity which embodies the princi-

boundary Harm from Hazardous Activities, 'States concerned shall take the necessary legislative, administrative or other action, including the establishment of suitable monitoring mechanisms to implement the provisions of the present articles'.[35] However, the nature and scope of this regulatory regime have been left to be determined by the Source State according to the requirements and circumstances of the activity.[36] This gives the Source State more flexibility to expand or to limit the substance of the regulations in accordance with the Articles. In Europe, for example, Directive 85/337/EEC of June 27, 1985 obliges the Member States to enact national environmental impact assessment legislation based on the Directive by July 1988. Accordingly, most of the Member States and some European non-Member States have enacted legislation that embodies the provisions of the Directive.[37] Similarly, the 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters provides that, 'each Party shall take the necessary legislative, regulatory and other measures, including measures to achieve compatibility between the provisions implementing the information, public participation and access-to-justice provisions in this Convention, as well as proper enforcement measures, to establish and maintain a clear, transparent and consistent framework to implement the provisions of this Convention'.[38]

This is also supported by Articles 207 and 213 of the UNCLOS.[39] Article 207 of this Convention obliges States to adopt laws and regulations and to take other measures in accordance with international standards to prevent, reduce, and control environmental damage from land-based sources.[40] It also

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ples provided for in international agreements. For instance, national nuclear liability legislation includes the same principles and rules provided for in a nuclear liability convention which is party to it.

[35] Article 5 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.

[36] Lammers, HYIL, Vol. 14, 2001, at p. 10.

[37] Kiss and Shelton, 1997, at p. 124.

[38] Article 3 (1) of the 1998 Aarhus Convention on Access to Information, June 25, 1998, 2161 UNTS 447.

[39] See also United Nations Convention on the Law of the Sea, concluded at Montego Bay on 10 December 1982, entered into force on 28 July 1994, [UNCLOS] Articles 211, 212, 217, 222, Dec. 10, 1982, 1833 U.N.T.S. 3. Article 211 discusses the establishment of regulatory regimes to prevent, reduce and control pollution from vessels in the marine environment and Article 217 provides for enforcement of such rules by the flag States. Article 212 provides for the obligation of States to establish regulatory regimes to prevent pollution from or through the atmosphere and Article 222 for the enforcement of such regulations.

[40] Article 207 of the UNCLOS.

obliges States to ensure that these laws, regulations, and measures are designed to reduce and control, to the fullest extent possible, the release of radioactive substances into the marine environment.[41] However, Article 213 of the Convention merely obliges States to ensure that these measures are implemented in accordance with international standards.[42]

Such a regulatory regime is needed to implement the rules and provisions of the relevant instruments established by the States to organize the activity. In the absence of such a regulatory regime, the operation of the activity is governed by the general rules of international law.[43] The State is responsible if it has failed to enact and enforce international environmental obligations.[44] Thus the establishment of such a regulatory regime is an essential condition for the Installation State to conduct nuclear activities.

Despite the fact that most nuclear activities used for peaceful purposes are conducted by private enterprises, they are closely supervised and controlled by the Installation State which determines the conditions and rules for conducting them in accordance with its national nuclear legislation.[45] Therefore specialized nuclear institutions have been established in nuclear States to regulate and implement these rules and to ensure that nuclear activities are conducted in accordance with the existing international obligations and standards.[46] This is a general principle recognized in international law, which is included, for example, in the nuclear liability conventions that included the nuclear liability principles in order to bring national law in line with international obligations.[47]

Thus the Installation State is obliged to establish a regulatory regime and to enact legislative and administrative regulations before the authorization of

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[41] Article 207 of the UNCLOS.

[42] Memorial of Ireland, "1982 United Nations Convention on the Law of the Sea before An Arbitral Tribunal Established under Annex VII: In the Dispute Concerning the MOX Plant, International Movements of Radioactive Materials, and the Protection of the Marine Environment of the Irish Sea", Ireland v. United Kingdom, Vol. I, 26 July 2002, at p. 206-209, available at http://www.pca-cpa.org/showpage.asp?pag_id=1148 (accessed on 1.3.2012).

[43] Okowa, 2000, at p. 115.

[44] Gábor Kecskés, "The Concept of State Responsibility and Liability in Nuclear Law", in: AJH, Vol. 49, No. 2, 2008, pp. 221-252, at p. 232.

[45] Helth and Safety Executive, "The Licensing of Nuclear Installations", at p. 5, available at: http://www.hse.gov.uk/nuclear/notesforapplicants.pdf (accessed on 26.2.2012).

[46] See, e.g., NEA, Nuclear Legislation in OECD Countries 2003, at p. 22. Legislation for other OECD Countries is available at: http://www.nea.fr/law/legislation/ (accessed on 19.10.2010).

[47] Katia Boustany, "The Development of Nuclear Law-Making or the Art of Legal "Evasion"", in: NLB, No. 61, 1998, pp. 39-53, at pp. 51-52.

a nuclear activity and to incorporate international rules and principles into national law.[48] However, it is entitled to receive assistance from the IAEA in the drafting of such a regulatory regime.[49] The IAEA and other international organizations enact nonbinding instruments, which are considered soft law and guidance for the States in enacting nuclear legislation.[50] Therefore, the IAEA has a supervisory role to ensure that such regulations have been enacted and implemented in accordance with international standards.

Such a regulatory regime should comprehensively include all regulations organizing the activity, such as legislation for the protection of the environment, nuclear safety, liability, determining of the authorities responsible for implementing such regulations, and other regulatory regimes required for the safe operation of nuclear installations.[51] The implementation of these regulations by the Installation State is the cornerstone of the obligation of prevention of nuclear accidents.

5.2.1.2 Designation of the liable person

According to the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities, the designation of the person who is liable for the operation, maintenance, and safe operation of a nuclear installation, as well as compensation for the victims in case of a nuclear accident caused by such activity is an essential obligation in international law.[52] The Draft Principles establish the general framework

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[48] Fifth Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Mr. Julio Baraboza, Special Rapporteur, U.N. Doc. A/CN.4/423, YILC, 1989, Vol. II, Part One, at p. 141, para. 66, UN Doc. A/CN.4/SER.A/1989/Add.1 (Part 1).

[49] IAEA, "Workshop on the Lesson Learned from the Integrated Review Services (IRRS) Mission to Spain", available at: http://www-pub.iaea.org/mtcd/meetings/Announcements.asp?ConfID=37373 (last visited 18.2.2012).

[50] Anthony Wetherall, "Normative Rule Making at the IAEA: Codes of Conduct", in: NLB, No. 75, 2005, pp. 71-93, at p. 72.

[51] See Tromans and FitzGerald, 1997.

[52] International Law Commission, Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities, U.N. Doc. A/61/10 (2006), available at: http://untreaty.un.org/ilc/texts/instruments/english/draft%20articles/9_10_2006.pdf (accessed on 30.8.2010). For the international liability for lawful activities see generally, Kecskés, AJH, Vol. 49, No. 2, 2008, pp. 221-252; Duncan E.J. Currie, "The Problems and Gaps in the Nuclear Liability Conventions and An Analysis of How An Actual Claim Would be Brought under the Current Existing Treaty Regime in the Event of A Nuclear Accident", in: DJILP, Vol. 35, No. 1, 2006, pp. 85-127; Alexandre Kiss, "State Responsibility and Liability for Nuclear Damage", in: DJILP, Vol. 35, No. 1, 2006, pp.

for international regimes of liability for damage caused by hazardous activities.[53] The Principles define the operator of a hazardous activity as 'any person in command or control of the activity at the time the incident causing transboundary damage occurs'.[54] According to the Draft Principles, the person liable for a hazardous activity is the operator of the activity.[55] The '"Operator" means any natural or legal person, including public authorities, in charge of an activity, e.g. supervising, planning to carry out or carrying out an activity'.[56] The operator is obliged to ensure prompt and adequate compensation to victims of transboundary damage caused by hazardous activities.[57] The operator is also obliged to preserve and protect the environment from hazards and transboundary damage caused by such activities, to take the necessary preventive measures to mitigate damage caused to the environment, and to restore and reinstate the environment to its previous condition.[58] The Principles have freed the Installation State from liability for damage caused by hazardous activities conducted within its territory or under its jurisdiction or control[59] unless it has failed to perform due diligence, which may constitute international responsibility according to State responsibility

67-83; Jon M. Van Dyke, "Liability and Compensation for Harm Caused by Nuclear Activities", in: DJILP, Vol. 35, No. 1, 2006, pp. 13-46; Ved P. Nanda, "International Environmental Norms Applicable to Nuclear Activities, with particular Focus on Decisions of International Tribunals and International Settlements", in: DJILP, Vol. 35, No. 1, 2006, pp. 47-65.

[53] Caroline Foster, "The ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities: Privatizing Risk?" in: RECIEL, Vol. 14, Issue 3, 2005, pp. 265-282, at p. 265; Alexandre Kiss & Dinah Shelton, "Strict Liability in International Environmental Law", in: Ndiaye and Wolfrum (eds.), 2007, pp. 1131-1151, at p. 1139.

[54] Principle 2 (g) of the ILC Draft principles on the allocation of loss.

[55] P. S. Rao, Second Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, International Law Commission, Fifty-sixth session. Geneva, 3 May-4 June and 5 July-6 August 2004, UN Doc. A/CN.4/540 (15 March 2004), at p. 6, para. 14.

[56] Article 1 (e) of the 1992 Convention on the Transboundary Effects by Industrial Accidents, adopted in Helsinki on Mar. 17-18, 1992, entered into force on 19 April 2000, 2105 U.N.T.S. 457, (2000), available also at: http://www.kimyasallar.cevreorman.gov.tr/docs/sozlesmeler/conventiontransboundaryeffectsonaccident.pdf (accessed on 3.9.2010).

[57] Principle 3 (a) of the ILC Draft principles on the allocation of loss.

[58] Principle 3 (a) of the ILC Draft principles on the allocation of loss; P. S. Rao, First Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, UN Doc. A/CN.4/531 (21 May 2003), at pp. 50-52, para. 153.

[59] Foster, RECIEL, Vol. 14, Issue 3, 2005, at p. 265.

for wrongful acts.[60] By holding the operator of the activity liable, the Principles have taken the same approach adopted by the "polluter pays" principle, which imposes the liability for environmental damage upon the polluter or the source of the damage, and the approach of the international civil liability conventions, which also imposes the liability for environmental damage caused by hazardous activities upon the operator of the activity.[61]

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[60] Alan Boyle, "Liability for Injurious Consequences of Acts Not Prohibited by International Law", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 95-104, at p. 98.

[61] "Survey of Liability Regimes Relevant to the Topic of International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International law (International Liability in Case of Loss from Transboundary Harm Arising Out of Hazardous Activities)" Prepared by the Secretariat, International Law Commission, Fifty-sixth session, Geneva, 3 May-4 June and 5 July-6 August 2004, A/CN.4/543, 24 June 2004, at pp. 89-130; Wolfrum and Langenfeld et al., 1999. See Article 3 of the 1961 Additional Convention to the 1961 International Convention Concerning the Carriage of Passengers and Luggage by Rail (CIV) of 25 February 1961, came into force on 25 January 1965, (UNTS, No. 16898, Vol. 1101, 1978, at p. 37), available also at: http://untreaty.un.org/unts/1_60000/30/28/00059369.pdf (accessed on 3.9.2010); Article III of the 1969 International Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, 973 U.N.T.S. 3, also available at: http://sedac.ciesin.columbia.edu/entri/texts/civil.liability.oil.pollution.damage.1969.html (accessed on 3.9.2010); Article 1 (3) and (4) of the 1976 Convention on Civil Liability for Oil Pollution Damage resulting from Exploration for and Exploitation of Seabed Mineral Resources, done in a conference held in London in October 1975 and December 1976 and signed on 1st May 1977, available at: http://folk.uio.no/erikro/WWW/HNS/Civil%20Liability%20offshore.pdf (accessed on 13.4.2012); http://www.dipublico.com.ar/english/convention-on-civil-liability-for-oil-pollution-damage-resulting-from-exploration-and-exploitation-of-seabed-mineral-resources/ (accessed on 13.4.2012); Article 8 of the 1988 Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA), 2 June 1988, 27 I.L.M. 859 (not in force), also available at: http://sedac.ciesin.org/entri/texts/acrc/cramra.txt.html (accessed on 3.9.2010); Articles 5-8 of the 1989 Convention on Civil Liability for Damage Caused During Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD, adopted 10 October 1989, Doc. ECE/TRANS/79 (not in force), available also at: http://www.unece.org/trans/danger/publi/crtd/crtd_e.html (accessed on 3.9.2010); Article 4 of the Protocol to Amend the International Convention on Civil Liability for Oil Pollution Damage of 29 November 1969, adopted at Brussels on Nov. 27, 1992, entered into force on 30 May 1996, 1956 U.N.T.S. 255, (1997), available also at: http://www.admiraltylawguide.com/conven/protocivilpol1992.html (accessed on 3.9.2010); Articles 17-19 of the 1999 Convention for the Unification of Certain Rules for International Carriage by Air, adopted in Montreal, May 28, 1999, entered into force on 4 November 2003, May 28, 1999, 2242 U.N.T.S. 309, (2004), available also at: http://untreaty.un.org/unts/144078_158780/3/5/11624.pdf (accessed on 3.9.2010); The 1999 Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, *adopted* Dec. 10, 1999,

The State is obliged to take all necessary measures to ensure the availability of prompt and adequate compensation for victims of transboundary damage caused by hazardous activities carried out within its territory or under its jurisdiction or control.[62] These measures include imposing strict liability upon the operator or other liable party[63] and requiring the liable person to maintain financial security, such as insurance or any other financial coverage, sufficient to cover his or her liability.[64] Moreover, 'these measures should include the requirement for the establishment of industry-wide funds at the national level'.[65] Finally, these measures should include additional compensation provided by the State of origin to ensure the fulfillment of the liability of the operator in the event that the initial compensation is insufficient to cover all damage caused by the accident.[66]

Thus the Articles were adopted in the form of principles, similar to the principles of liability embodied in the nuclear liability conventions except that they are not binding on the States.[67] The Contracting Parties to the nuclear liability conventions are obliged to enact national legislation which includes, of course, the nuclear liability principles adopted by the conven-

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Doc. UNEP/CHW .1/WG/1/9/2 (not in force), available also at: http://www.jus.uio.no/english/services/library/treaties/06/6-07/liability-transboundary-movements.xml (accessed on 3.9.2010); Article 3 (1) of the 2001 International Convention on Civil Liability for Banker Oil Pollution Damage (BUNKER), adopted Mar. 23, 2001, entered into force on 21 November 2008, GR. BRIT. T.S. MISC. No. 8 (2005), also available at: http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-on-Civil-Liability-for-Bunker-Oil-Pollution-Damage-(BUNKER).aspx (accessed on 18.4.2012); Article 3 (1) of the 2009 Convention on Compensation for Damage Caused by Aircraft to Third Parties, *considered* in Montreal on Apr. 20-May 2, 2009, United Nations International Civil Aviation Organization, DCCD Doc. No. 42, 1/5/09, (not open for signature; not in force), available at: http://www.icao.int/DCCD2009/docs/DCCD_doc_42_en.pdf (accessed on 18.4.2012); Article 7 (1) of the International Conference on the Revision of the HNS Convention: Consideration of the Draft Protocol of 2010 to the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996, considered Oct. 5, 2009, United Nations International Maritime Organization LEG/CONF.17/3 (not open for signature; not in force) available at: http://folk.uio.no/erikro/WWW/HNS/LEG-CONF.17-3.pdf (accessed on 23.4.2012).

[62] Principle 4 (1) of the ILC Draft principles on the allocation of loss.

[63] Principle 4 (2) of the ILC Draft principles on the allocation of loss.

[64] Principle 4 (3) of the ILC Draft principles on the allocation of loss.

[65] Principle 4 (4) of the ILC Draft principles on the allocation of loss.

[66] Principle 4 (5) of the ILC Draft principles on the allocation of loss.

[67] Matheson, AJIL, Vol. 99, No. 1, 2005), at p. 212.

tions.[68] In the absence of such legislation they are obliged to apply the nuclear liability conventions themselves to the issues of nuclear liability.[69]

Accordingly, designation of the liable person for the operation of a nuclear installation and compensation for the resulting nuclear damage from nuclear activities are governed by the nuclear liability conventions.[70] These

[68] Norbert Pelzer, "Conflict of Laws Issues under the International Nuclear Liability Conventions", in: Jürgen F. Baur, Otto Sandrock, Boris Scholtka and Amos Shapira (eds.), Festschrift für Gunther Kühne zum 70. Geburtstag, Verlag Recht und Wirtschaft GmbH Frankfurt am Main, 2009, pp. 819-842, at p. 822. Boustany, NLB, No. 61, 1998, at pp. 51-52. For the nuclear liability principles see, Pelzer, 1994, at pp. 275-279; Schwartz, 2006, at pp. 39-41; International Expert Group on Nuclear Liability (INLEX), "The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage: Explanatory Texts, IAEA, (July 2004), at pp. 8-16, available at: http://www.iaea.org/About/Policy/GC/GC48/Documents/gc48inf-5expltext.pdf (accessed on 18.2.2012); Michel Montjoie, "Nuclear Energy", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 915-928, at p. 916. Peter H. Sand, "The Effectiveness of International Environmental Agreements: A Survey of Existing Legal Instruments", Cambridge, Grotius Publications Limited, England, 1992, at p. 388. For nuclear liability legislation see, OECD/NEA, "Nuclear Legislation: Third Party Liability", OECD, Paris 1990. The national nuclear liability regimes include the principles of nuclear liability adopted in the nuclear liability conventions, except some legislation such as the USA legislation which adopted the principles of the common law. However, the principles of liability under the nuclear liability conventions are different from those under the common law. The liability of the operator under the nuclear liability conventions, for instance, is based only on the principle of absolute liability, while the liability under the common law may be based on the principle of absolute liability or any other liability principle such fault or negligence of the operator. Consequently, it is easy to attribute the liability for damage caused by a nuclear accident to the operator according to the principle of absolute liability, while it is difficult to prove it according to the principle of fault liability because the proof of the operator's fault is a difficult task in relation to nuclear damage which in some cases may take a few decades to develop.

[69] Pierre-Marie Dupuy, "La responsabilité internationale des États pour les dommages d'origine technologique et industrielle", Paris, A. Pedone 1976, at pp. 118-120.

[70] The 1960 Convention on Third Party Liability in the Field of Nuclear Energy, adopted July, 29 1960, as amended by the Additional Protocol of Jan. 28, 1964, by the Protocol of Nov. 16, 1982 and by the Protocol of Feb. 12, 2004, Nuclear Energy Agency NE(2002)6/REV1 (2004) available at: http://www.nea.fr/html/law/paris_convention.pdf [hereinafter Paris Convention]; Convention of Jan. 31, 1963 Supplementary to the Paris Convention of July 29, 1960, as amended by the additional Protocol of Jan. 28, 1964 and by the Protocol of Nov. 16, 1982 Nuclear Energy Agency NE(2002)6/REV1 (2004) available at: http://www.nea.fr/law/nlbrussels.html; Convention on Civil Liability for Nuclear Damage, opened for signature Apr. 29-May 19, 1963, 1063 U.N.T.S. 266, 2 ILM (1963) 727, (Part I, SCNL/17.I/INF.7 and Part II, SCNL/17.II/INF.7; ILM, Vol. XXXVI, No. 6, 1997, at p. 1454 (entered into force, Nov. 12, 1977) amended by the 1997 Protocol, opened for signature Sept. 29, 1997, 2241 U.N.T.S. 270 (entered into force,

conventions define the liable person as 'any individual or partnership or any public or private body, whether corporate or not, any international organisation enjoying legal personality under the law of the installation State, including a State or any of its constituent subdivisions'.[71] Thus the conventions defined the liable person as broadly as possible in order to overcome the differences in the definitions of the liable person under different national liability laws.[72] The fact that, it was taken into account nuclear installations may be operated by either private operators or by the State itself. It is known that the majority of nuclear installations are operated by private operators, while in some cases a Contracting Party to a nuclear liability convention may serve as a nuclear operator, as is often the case for research installations and in developing countries.[73] For example, the 1962 Nuclear Ships Convention stipulates that a Contracting Party can serve as an operator of a nuclear ship.[74] In one specific example, when the ship, the Savanna, was transferred from an agent of the US government (American Export Isbrandtsen Lines) to a private company (Fast Company), liability for any potential nuclear damage was also transferred from the U.S. Atomic Energy Commission to the private company.[75] However, there are also international nuclear installations that are operated coop-

Oct. 4, 2003); For the Consolidated Text of the Vienna Convention on Civil Liability for Nuclear Damage as Amended by the 1997 Vienna Convention Protocol, Article I (1) (a) and Article II, see IAEA Doc. GOV/INF822/Add.1; GC(41)/INF/13/Add.1 of 23 September 1997); Vienna Convention on Civil Liability for Nuclear Damage, (Part I, SCNL/17.I/INF.7 and Part II, SCNL/17.II/INF.7), IAEA Doc. GOV/INF/822/Add.1-GC(41)/INF/13/Add.1 (Sept. 12, 1997) available at: http://www.iaea.org/About/Policy/GC/GC41/GC41InfDocuments/English/gc41inf-13-add1_en.pdf; Convention on Supplementary Compensation for Nuclear Damage art. III, adopted Sept. 12, 1997, IAEA INFCIRC/567 (22 July 1998) available at: http://www.iaea.org/Publications/Documents/Infcircs/1998/infcirc567.pdf; The 1962 Convention on the Liability of Operators of Nuclear Ships (the 1962 Nuclear Ships Convention), AJIL, Vol. 57, No. 1, 1963, at p. 102; the 1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material (the 1971 Carriage of Nuclear Material Convention), U.N.T.S, Vol. 974, at p. 255.

[71] Article 1 (I) (a) of the 1963 Vienna Convention; Article I (3) of the 1962 Brussels Nuclear Ships Convention.

[72] IAEA, "Civil Liability for Nuclear Damage: Official Records", International Conference, Legal Series No. 2, Vienna, 29 April-19 May 1963, IAEA, Vienna 1964, at p. 72, para. 37.

[73] IAEA, "Insurance for Nuclear Installations", IAEA Legal Series No. 6, 1970, pp. 8-12, at p. 10.

[74] Article I 4 of the 1962 Brussels Nuclear Ships Convention.

[75] Werner Boulanger, "Basic Features of Bilateral Agreements Regulating Visits of Nuclear Ships", in: IAEA, Experience and Trends in Nuclear Law, IAEA Legal Series, No. 8, 1972, pp. 125-129, at p. 127.

eratively by several States, such as "the Joint Institute in Dubna" and "the European Company for the Chemical Processing of Irradiated Fuels", as well as research installations and laboratories operated by international organizations such as those operated by the IAEA.[76] Such installations are considered nuclear installations under the Vienna Convention when they meet the definition of a nuclear installation given in Article I (j) of the Convention. Therefore, they are governed by the agreement concluded for the establishment of the company or organization. In the absence of a provision in these agreements or of any agreement concluded with the host State that provides to the contrary, the matter in relation to civil liability is governed by the national legislation of the Installation State in whose territory the installation is located which is then considered the Installation State according to the Vienna Convention.[77]

The liable person, as identified by the nuclear liability conventions, is the operator authorized by the Installation State to operate a nuclear installation or to carry out a nuclear activity.[78] However, there are others involved in the nuclear industry, such as those who replenish nuclear installations with nuclear substances or who reprocess nuclear wastes. In the absence of a liable operator of a nuclear installation, the legislation of the Installation State may instead designate the carrier or the person handling radioactive waste as a liable operator.[79] Furthermore, a person other than the operator of a nuclear installation may be designated as the liable operator according to any earlier transportation agreement in force before the adoption of a nuclear liability convention or in the case of means of transport.[80] Moreover, in some cases, there are other persons who are designated jointly and severally liable with the operator for damage caused by a nuclear accident, particularly if no individual liability is identified.[81] Similarly, liability might be shared among

[76] IAEA, Legal Series No. 2, 1964, at p. 70, para. 31.
[77] IAEA, Legal Series No. 2, 1964, at p. 70, para. 31.
[78] Article 1 (a) (vi), Article 3 (a) and Article 6 (a) and (b) of the 1960 Paris Convention; Article II and Article I (c) of the 1963Vienna Convention; Article 1 (4) of the 1962 Brussels Nuclear Ships Convention.
[79] Article II (2) of the 1963 Vienna Convention.
[80] Article IV (5) (b) and Article II (5) of the 1963 Vienna Convention; Article 6 (b) and (c) (2), and Annex I, Reservation No. 1 of the 1960 Paris Convention.
[81] Article 5 (d) of the Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982, Feb. 12, 2004, http://www.nea.fr/law/brussels-supplementary-convention-protocol.html; Article II 3 (a) of the 1963 Vienna Convention; Article 7 (1) of the Annex of the 1997 Convention on Supplementary Compensation for Nuclear Damage; Article VII (1) of the 1962 Convention on the Liability of Operators of Nuclear Ships.

several consignments involved in an accident if the individual cause of an accident cannot be ascertained.[82]

The designated operator should maintain insurance or other financial security to cover his liability according to the applicable nuclear liability convention.[83] According to the Paris Convention, for example, circumstances such as bankruptcy 'could not set aside the obligation of the operator under Article 10 or that of the State which is required to ensure that the operator always holds financial security up to this maximum liability. The Contacting Parties may therefore be led to intervene in such a situation to avoid their international responsibilities being involved'.[84] Therefore in 'the absence of any liable and insured operator required to compensate this damage by virtue of the Convention, [the damage] would be ascribable solely to the Contracting Party responsible for designating this operator'.[85] Thus the Installation State is obliged to either designate the liable person for nuclear damage and to comply with the obligations of the applicable convention or to accept liability itself.[86] Such liability is imposed on the State, as "any private operator", according to the nuclear liability conventions and applies in national law and courts.[87]

Moreover, the Installation State and other contracting States are obliged to intervene to provide supplementary compensation for the victims if compensation under the applicable nuclear liability convention is insufficient[88] or

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[82] Article 5 (4) of the 1960 Paris Convention; Article II (3) (b) of the 1963 Vienna Convention.

[83] Exposé des Motifs of the 1960 Paris Convention, para. 15. Nuclear Energy Agency, Revised Text of the Exposé des Motifs of the Paris Convention, Approved by the OECD Council on 16th November 1982, available at: http://www.nea.fr/law/nlparis_motif.html (last visited, 21 September 2010).

[84] Exposé des Motifs of the Paris Convention, para. 49.

[85] Note by the Secretariat, Nuclear Energy Agency, Group of Governmental Experts on Third Party Liability in the Field on Nuclear Energy: Determination of a Liability Regime Applicable to the Long term Storage and Final Disposal of Radioactive Waste, NEA/LEG/DOC(94)1, at p. 32.

[86] IAEA, INLEX, 2004, at p. 26.

[87] The nuclear liability conventions as part of private international law govern the issues of civil liability for nuclear damage which are applied by national law and courts. They apply to persons and the State alike when it acts as a private person. See generally, Pelzer, 2009, at p. 828 and p. 831.

[88] See Article III of the 1997 Convention on Supplementary Compensation for Nuclear Damage; Article 3 of the 1963 Brussels Supplementary Convention the Paris Convention as amended by the 2004 Protocol. Ben McRae, "The Compensation Convention: Path to a Global Regime for Dealing with Legal Liability and Compensation for Nuclear Damage", in: NLB, No. 61, 1998, pp. 25-38, at p. 29, reproduced in OECD/NEA, "International Nuclear Law in the Post-Chernobyl Period", OECD, 2006, pp. 187-200; Ben

subsidiary compensation if the operator has failed to fulfill his financial obligations.[89] This is a secondary liability because it is not performed by the State unless the liability of the operator has been exhausted. In that case, the State is liable as a private person under national law rather than international law.[90] Finally, in the case of State-operated nuclear installations used for non-peaceful ends[91] and nuclear-powered spacecraft, the operating State is liable for damage caused by such installations under international law.[92]

McRae, "Overview of the Convention on Supplementary Compensation", in: OECD/NEA and IAEA, 2000, pp. 171-183, at pp. 179-180.

[89] Article VII (1) of the 1963 Vienna Convention; Article III (2) of the 1962 Brussels Nuclear Ships Convention; Article VII (1) (a) of the 1997 Amended Vienna Convention; Torben Melchior, "Intervention of States in Supplementary Compensation for Nuclear Accidents", in: OECD/NEA and IAEA, 1993, pp. 447-463, at p. 448.

[90] Günther Handl, "Towards a global System of Compensation for Transboundary Nuclear Damage: Reflexions on the Interrelationship of Civil and International State Liability", in: OECD/NEA and IAEA, 1993, pp. 497-520, at p. 500.

[91] Note that nuclear installations used for non-peaceful purposes are not covered under the nuclear liability conventions. However, these installations can cause nuclear damage similar to or greater than those caused by nuclear installations for peaceful purposes. Also, because nuclear waste from such facilities may be comingled with other nuclear waste, it can be indistinguishable in the case of a nuclear accident. See Nuclear Energy Agency, Note by the Secretariat, Progress in Work on the Revision of the Vienna Convention and Questions Relating to the Co-ordination between that Convention and the Paris Convention, (NEA/LEG/DOC(91)2, Paris, drafted: 10 May 1991, at p. 4; NEA, Liability and Compensation, 1994, at pp. 124-125; Standing Committee on Liability for Nuclear Damage, Draft Report of the Standing Committee on Liability for Nuclear Damage, SCNL/10/INF.3, 4 November 1994, Annex I, at p. 6) Therefore during the negotiation on the 1997 Protocol to amend to the 1963 Vienna Convention, it was suggested the Convention should cover nuclear installations for non-peaceful purposes. Standing Committee on Liability for Nuclear Damage, Report of the Standing Committee on Liability for Nuclear Damage, (SCNL/1/INF.4, 1990, at p. 5; Standing Committee on Liability for Nuclear Damage, Report of the Standing Committee on Liability for Nuclear Damage, SCNL/4/INF.6, 12 December 1991 at p. 3; Louse de La Fayette, "Nuclear Liability Revised", in: RECIEL, Vol. 1, Issue 4, 1992, pp. 443-452, at p. 448; see report of the Third Session of the Standing Committee on Liability for Nuclear Damage, Annex II) However, that proposal was rejected by the nuclear States and insurance companies. Nuclear Energy Agency, Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy: Position of the European Insurance Committee on Proposed Amendments to the Vienna Convention (NEA/LEG/DOC(95)1, 1995, at p. 4). Also, the 1962 Nuclear Ships Convention has not entered into force because it was rejected by the nuclear States-particularly the United States and the former Soviet Union- which were the only two States operating nuclear power-ships at that time. The rejection of the USA and USSR was due to the inclusion of warships in the Convention. See IAEA International Law Series, No. 3, IAEA Vienna 2007, at p. 6, footnote 3. The United States declared that it would compensate victims of the damage caused by nuclear ships if the

5.2.1.3 Environmental impact assessment

International law mandates that Installation States require an environmental impact assessment (EIA) of the environmental impact of the proposed activity.[93] An EIA should consist of a comprehensive study of the proposed activity.[94] The information helps the competent authorities decide about the authorization of a nuclear activity and take preventive measures to avoid harmful environmental consequences which may result from the activity.[95] An EIA, therefore, is reported and directed to the national authorities to

liability covered under maritime conventions was applicable. At the time of the rejection there were three nuclear ships in operation: the United States' nuclear ship, Savannah, was the first Nuclear Ship; the Soviet Union's icebreaker Lenin and the Germany's nuclear ship Otto Hahn, while more than fifty naval units were in operation or under construction. See, W. Boulanger "International Conventions and Agreements on Nuclear Ships", in: IAEA Legal Series, No. 5, 1969, at p. 177; G. N. Barrie, "International Law and the Civil Use of Nuclear Energy", in: SAYIL, Vol. 2, 1976, pp. 97-110, at p. 99.

[92] Article II of the 1972 Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 961 U.N.T.S. 188; Principles 8 and 9, the 1992 Principles Relevant to the Use of Nuclear Power Sources in Outer Space and Other Recent Development, G.A. Res. 47/68, U.N. Doc. A/RES/47/68 (Dec. 14, 1992.

[93] For environmental risk assessment, see Neil Craik, "The International Law of Environmental Impact Assessment", Cambridge University Press, Cambridge, Madrid, New York, 2008; Kees Bastmeijer and Timo Koivurova, "Transboundary Environmental Impact Assessment: An Introduction", in: Kees Bastmeijer and Timo Koivurova (eds.), Theory and Practice of Transboundary Environmental Impact Assessment, Brill/Martinus Nijhoff Publishers, Leiden/Boston, 2008, pp. 1-25, available at: http://ssrn.com/abstract=1297230 (accessed on 3.8.2009); Angela Z. Cassar & Carl E. Bruch, "Transboundary Environmental Impact Assessment in International Watercourse Management", in: NYUELJ, Vol. 12, 2003, pp. 169-244; Charles M. Kersten, "Rethinking Transboundary Environmental Impact Assessment", in: YJIL, Vol. 34, Issue 1, 2009, pp. 173-206; Kwiatkowska, Barbara, "The Ireland v United Kingdom (MOX Plant) Case: Applying the Doctrine of Treaty Parallelism", in: IJMCL, Vol. 18, No. 1, 2003, pp. 1-58; Stephen G. Burns, "Looking Backward, Moving Forward: Licensing New Reactors in the United States", in: NLB, No. 81, 2008, pp. 7-29, at pp. 11-15; Stanley David Berger, "Development in Nuclear Energy", in: NLB, No. 81, 2008, pp. 55-73, at pp. 59-69; Philippe G. Le Prestre, "Environmental Learning at the World Bank", in: Robert V. Bartlett, Priya A. Kurian, and Madhu Malik (eds.), International Organizations and International Policy, Greenwood Press, Westport, Connecticut. London, 1995, pp. 84-101, at p. 89; Brian R. Popiel, "From Customary Law to Environmental Impact Assessment: A New Approach to Avoiding Transboundary Environmental Damage between Canada and the United States", in: BCEALR, Vol. 22, Issue 2, 1995, pp. 447-479, at p. 462; John Glasson, Riki Therivel, Andrew Chadwick, "Introduction to Environmental Impact Assessment", First Edition, New York, 2005.

[94] Hassan, 2006, at p. 56.

[95] Sands, 2003, at p. 800; see also Kiss and Shelton, 1997, at p. 125.

guide them in taking the relevant steps for the protection of the environment.[96]

An EIA must be carried out by the operator and evaluated by the responsible authorities.[97] This assessment must include the nature of the activity and its possible impact on persons, property, the environment of other States, and the global environment in general.[98] The competent authorities in the Installation State are obliged to ensure that the assessment of the risks likely to result from the operation of a hazardous activity has been undertaken by the operator before granting the authorization for the construction of the installation.[99] However, an EIA can be carried out by the authorities themselves in the case of a nuclear facility operated by the State.[100] This means that an EIA is an essential condition for the operator to obtain the licence for constructing and operating a nuclear facility. Therefore, conflicts often arise between the designers, the builder, the national authorities and the authorizing body.[101] This requires close collaboration between the licensing authorities and the operators of the plant.

Site selection is an important component of an EIA[102] and is often one of the most difficult issues confronting the national authorities in the construc-

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[96] As Sands argues: 'An environmental impact assessment describes a *process* which produces a written *statement* to be used to guide decision-making, with several related functions. First, it should provide decision-makers with information on the environmental consequences of proposed activities and, in some cases, programmes and policies, and their alternatives. Secondly, it requires decisions to be influenced by that information. And, thirdly, it provides a mechanism for ensuring the participation of potentially affected persons in the decision-making process'. Sands, 2003, at p. 800.

[97] Lammers, HYIL, Vol. 14, 2001, at p. 13.

[98] Julio Barboza, "International Liability for the Injurious Consequences of Acts Not Prohibited by International Law and Protection of the Environment", in: RDC, Vol. 247, Part III, 1994, pp. 291-405, at p. 334.

[99] Barboza, RDC, Vol. 247, Part III, 1994, at p. 334.

[100] For example, nuclear research reactors are operated by the public authorities of a nation State. In developing countries, nuclear power facilities are usually operated by the State and not by private enterprises. In these cases, environmental impact assessment required for the construction of a nuclear installation is normally conducted by the public authorities of the State. For instance, the electricity sector in Egypt is run by the government; it recently announced that it would construct a number of nuclear power plants. Therefore, environmental impact assessment is underway by the public authorities to ensure the site of the plants is fit and does not pose a potential harm to the environment.

[101] A. Massera, "Technical Basis of Reactor Licensing", in: IAEA Legal Series, No. 5, 1969, pp. 182-186, at p. 185.

[102] IAEA, "Site Evaluation for Nuclear Installations: Safety Requirements", IAEA Safety Standards Series, NS-R-3, IAEA Vienna 2003, available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1177_web.pdf (accessed on 20.2.2012)

tion of a nuclear power facility.[103] The selection of the site of a nuclear power plant is subject to certain criteria and standards that are required for the protection of people, property, and the environment.[104] This can be decided by the competent authorities only after strict examination of certain considerations.[105] There are three primary considerations.[106] First, the location of a nuclear power plant should be chosen to minimize adverse environmental impact. It should be chosen far away from places likely to be affected by natural catastrophes, such as earthquakes and floods, as well as industrial catastrophes, such as chemical explosions or aircrafts crashes.[107] Secondly, it should be located close to a supply of cooling water and have access to high voltage transmission lines. Thirdly, meteorological, geological, seismic and hydro-geological factors should be taken into account.[108]

Accordingly, an EIA ensures that adequate and early information is obtained regarding environmental damage likely to result from a hazardous activity and that measures to mitigate such damage are adopted.[109] As mentioned in the MOX Plant Case (Ireland v. England):

> 'The objectives of a proper environmental assessment are, *inter alia*, to ensure that the activities comply with international environmental obligations, to ensure that the activities comply with the applicable international environmental

[103] Massera, IAEA Legal Series, No. 5, 1969, at p. 185.

[104] For the criteria of selection of nuclear installation sites, see IAEA, Safety Standards Series No. NS-R-3, 2003.

[105] Roshan A. D, Shylamoni P., Sourav Acharya, "Monograph on Sitting of Nuclear Power Plants", Civil & Structure Engineering Division, Atomic Energy Regulatory Board, Mumbai, India, available at: http://www.aerb.gov.in/t/sj/Siting.pdf (accessed on 22.2.2012); See Chapter 11, Sitting and environmental aspects, available at: http://www.kntc.re.kr/openlec/policy/part3/part3_chapter11.htm (accessed on 22.2.2012); Horizon Nuclear Power Limited, "Proposed Nuclear Power Station at Oldbury: Environmental Impact Assessment, Scoping Report", November 2009, at p. 29, available at: http://www.eon-uk.com/20091111_Oldbury_Scoping_Report_Final.pdf (accessed on 20.2.2012); "The Environmental Impact Assessment Notification, 1994", Government of India, Ministry of Environment & Forest New Delhi Notification on Environmental Impact Assessment of Development Projects, New Delhi, the 27th January, 1994, available at: http://mines.nic.in/writereaddata/filelinks/e7c11e94_6.html (accessed on 18.2.2012).

[106] Environmental Impact Assessment, 1994; "Implementation of the Obligations of the Convention on Nuclear Safety in Lithuania: The Fourth Lithuanian Report in Accordance with Article 5 of the Convention", Vilnius 2007, at p. 74, available at: http://www.vatesi.lt/fileadmin/documents/leidiniai/lt/4th-report.pdf (accessed on 18.2.2012); Stoiber, Baer, Pelzer and Tonhauser, 2003, at p. 65.

[107] Roshan, Shylamoni, Acharya, (accessed on 22.2.2012); ENPPA, 1986, at p. 44.

[108] IAEA, Safety Standards Series, No. NS-R-3, 2003 at pp. 10-15.

[109] Kiss and Shelton, 1997, at pp. 123-124.

> obligations, to ensure that appropriate protective and response measures may be taken, to ensure that alternative proposals have been fully considered, and to ensure that interested parties and concerned States are fully informed of the environmental implications of the project'.[110]

Under customary international law, States are obliged to conduct an EIA and notify potentially affected States of activities conducted within their territory, or under their jurisdiction or control, and of potential transboundary harm.[111] In the 2010 Case Concerning Pulp Mills on the River Uruguay, the International Court of Justice held that an EIA is, in fact, required under customary international law when proposed industrial activity may pose a significant transboundary environmental risk.[112]

This principle was also adopted by the ILC Draft Articles on International Liability for Lawful Acts and in other international instruments.[113] According to Draft Article 12, Chapter II of the Draft Articles on International Liability for Acts Not Prohibited by International Law:

> 'Before taking a decision to authorize an activity referred to in article 1, a State shall ensure that an assessment is undertaken of the risk of the activity causing significant transboundary harm. Such an assessment shall include an evaluation of the possible impact of that activity on persons or property as well as on the environment of other States'.[114]

This provision is reflected in the text of the ILC Draft Articles on the Prevention of Transboundary Harm, which provide that '[a]ny decision in respect of the authorization of an activity within the scope of the present articles shall, in particular, be based on an assessment of the possible transboundary

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[110] 1982 United Nations Convention on the Law of the Sea Before an Arbitral Tribunal Established Under Annex VII: In the Dispute Concerning the MOX Plant, International Movements of Radioactive Materials, and the Protection of Marine Environment of the Irish Sea (Ireland v. United Kingdom, Memorial of Ireland, Vol. I, 26 July 2002, Part II, Chapter 7, at p. 111.

[111] Günther Handl, "Environmental Protection and Development in Third World Countries", in: NYUJILP, Vol. 20, 1987-1988, pp. 603-627, at p. 615.

[112] The International Court of Justice, Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), 20 April 2010 Judgment, at pp. 60-61, para. 204, available at: http://www.icj-cij.org/docket/files/135/15877.pdf?PHPSESSID=f59011c4e4079882 (accessed on 21.5.2010).

[113] Report of the Commission to the General Assembly on the Work of its Forty-Fifth Session, 1993, U.N. Doc. A/CN.4/SER.A/1993, YILC, 1993, Vol. II, Part Two, at pp. 27-28, paras. 142-147.

[114] Article 12 of the International liability for injurious consequences arising out of acts not prohibited by international law, Summary Records for the Meeting of the Forty-Sixth Session, 1994, UN Doc. A/CN.4/SER.A/1994, YILC, 1994, Vol. I, at p. 235, para. 70.

harm caused by that activity, including any environmental impact assessment'.[115] The Articles address this issue very generally[116] and leave the content of risk assessments to be decided by the national law of the State carrying out the activity.[117] This was indicated by the Stockholm and Rio Declarations. According to Principle 17 of the Rio Declaration, '[e]nvironmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority'.[118]

This obligation of an EIA is also supported by most instruments related to the environment in international law.[119] For example, Article 3(2) of Directive 2001/42/EC of the European Parliament mandates that EIAs should be conducted for all projects listed in Annexes I and II of Directive 85/337/EEC.[120] The scope of this Directive is very broad, requiring assessment of both the direct and indirect effects of the proposed public and private projects likely to have significant harmful consequences on the environment due to their nature, size or location.[121] This includes an assessment of the impact of such projects on human beings, fauna and flora, soil, water, air, climate and landscape, and the interaction between them, as well as ma-

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[115] Article 7 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.

[116] The Articles have established a framework agreement and leave States to establish different regimes to regulate the activities within the framework of the articles. See YILC 1993, Vol. II, Part Two, at p. 31, para. 179.

[117] John H. Knox, "Assessing the Candidates for A Global Treaty on Transboundary Environmental Impact Assessment", in: NYUELJ, Vol. 12, 2003, pp. 153-168, at p. 161.

[118] Principle 17 of the Rio Declaration, Report of the United Nations Conference on Environment and Development, June 3-14, 1992, Rio Declaration on Environment and Development, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I), Annex 1 (Aug. 12, 1992).

[119] Article 2, Council Directive 85/337/EEC of June 27, 1985 on the assessment of the effects of certain public and private projects on the environment, (85/337/EEC). OJ L175, 5 July 1985, 40, 1985L0337— EN— 25.06.2009 — 003.001— 1, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1985L0337:20090625:EN:PDF (accessed on 26.4.2012).

[120] This Article stipulates that 'an environmental assessment shall be carried out for all plans and programmes, (a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II to Directive 85/337/EEC, or (b) which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of Directive 92/43/EEC'. L 197/30 EN Official Journal of the European Communities 21.7.2001, at p. 32.

[121] Kiss and Shelton, 1997, at p. 124.

terial assets and the cultural heritage.[122] The purpose of these projects and plans is to integrate the environmental impact assessment process and existing plans and procedures adopted by the Member States.[123] As Sands pointed out:

> 'The 1985 EC Directive on Environmental Impact Assessment led the way in providing international guidance on the nature and extent of an environmental impact assessment and the use to which it should be put, an approach subsequently adopted and extended in 1991 UNECE Convention on Environmental Impact Assessment in a Transboundary Context (1991 Espoo Convention)'.[124]

The 1991 Espoo Convention on Environmental Impact Assessment in a Transboundary Context[125] is the only convention that contains detailed provisions on environmental impact assessments and applies to different hazardous activities, including nuclear activities. It obliges the State of origin which conducts an activity listed in Appendix I of the Convention to ensure that an EIA is conducted prior to a decision to authorize or conduct the proposed activity.[126] Thus under this Convention, nuclear activities are subject to EIA procedures, with the exception of some activities, such as 'research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 [kilowatt] continuous thermal load'.[127] Moreover, the assessment of risks and effects of pollution on the marine environment is provided for under Articles 204, 205 and 206 of the UNCLOS.[128] Article 206 of this Convention obliges States to report for assessment of potential effects of the planned activities.[129] Support for the principle is also found in Article 14 (1) of the Convention on Biological

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[122] Kiss and Shelton, 1997, at p. 124.
[123] Peter G. Davies "European Union Environmental Law: An Introduction to Key Selected Issues", 2004, at p. 158.
[124] Sands, 2003, at p. 803.
[125] Convention on Environmental Impact Assessment in a Transboundary Context, adopted at Espoo, Finland, on 25 February 1991, 1989 U.N.T.S. 309, available also at: http://www.unece.org/env/eia/documents/legaltexts/conventiontextenglish.pdf (accessed on 24.3.2010).
[126] Article 2 (3) of the 1991 Espoo Convention.
[127] Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Annex I, concluded in Aarhus, Denmark, on 25 June 1998, entered into force on 30 October 2001, 2161 U.N.T.S. 447, (2001), available at http:// www.unece.org/env/pp/documents/cep43e.pdf [hereinafter, Aarhus Convention].
[128] Third United Nations Conference on the Law of the Sea, 1973-1982, Montego Bay, Jamaica, art. 206, U.N. Doc. A/CONF.62/122 (Dec. 10, 1982), 21 ILM 1261 (1982).
[129] Weiss, Magraw and Szasz, 1992, p. 332.

Diversity which provides for environmental impact assessment, minimizing the effects of that impact, and allowing public participation.[130]

In fact, the assessment of the environmental impact of a nuclear activity is not only required for the proposed activity, but also for related activities. An EIA of a nuclear activity is a continual procedural decision that should begin prior to the activity, continue over the economic life-time of the activity, and include an assessment of the possible consequences of the storage of radioactive waste.[131] The responsible authorities should evaluate the existing risk before the operation and evaluate the possibility of damage which is likely to occur in the future as a result of a nuclear accident or the damage that might be caused by disposal of the resulting nuclear wastes in the future.[132]

5.2.1.4 Prior authorization

A State must ensure that any activity undertaken within its territory or under its jurisdiction or control which may cause transboundary harm has prior authorization.[133] In its decision in the Corfu Channel case the ICJ referred to the authorization and monitoring of harmful activities with regard to preventing industrial catastrophes, stating that it is 'every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States'.[134] According to the ILC Draft Articles on International Liability[135] and the ILC Draft Articles on Prevention of Transboundary harm, prior authorization is required before hazardous activities are undertaken and if

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[130] Article 14 (1) of the 1992 Convention on Biological Diversity provides that, '[e]ach Contracting Party, as far as possible and as appropriate, shall: (a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures'. (1992) 31 I.L.M. 822, available also at: http://www.cbd.int/convention/articles/?a=cbd-14 (accessed on 17.1.2012).

[131] ILC Secretariat Survey, "Survey of State Practice Relevant to International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law", Study prepared by ILC Secretariat, United Nations, General Assembly, A/CN.4/384, 16 October 1984, International Law Commission, Thirty-Seventh Session, 6 May-26 July 1985, at p. 126.

[132] Article 7 of the 2001 Draft Articles on prevention of transboundary harm.

[133] Report of ILC on the work of its forty-sixth session, 2 May-22 July 1994, to the General Assembly, Supplement No. 10 (A/49/10), at p. 404.

[134] Corfu Channel (U.K. v. Albania), ICJ Reports 1949, at p. 22.

[135] Article 11 of the 1993 Draft Articles on international liability for injurious consequences arising out of acts not prohibited by international law, YILC, 1993, Vol. II, Part Two, at p. 26, para. 138; Verheyen, 2005, at p. 158.

any major change in or plan to change an activity brings it within the scope of the Draft Articles.[136] Moreover, this authorization is also required for pre-existing activities within the scope of the Draft Articles.[137] Thus after the Draft Articles enter into force, the Source States have to review the authorization of the pre-existing activities in its territory or under its jurisdiction or control and issue new authorization for these activities in order to comply with the provisions of the Articles.[138] Finally, in case of a failure to fulfill the requirement of the authorization, the State of origin can take the necessary actions as appropriate, including termination of authorization.[139]

Accordingly, Article 6 of the ILC Draft Articles on Prevention of Transboundary Harm is a general provision and does not provide specific requirements for the authorization.[140] This leaves the determination of the requirements for authorization to the competent authorities according to national law.[141] This gives the competent authorities the flexibility to determine the conditions of the required authorization according to the circumstances.[142] On the other hand, this flexibility may allow States to authorize an activity conflicting with the objective of the articles. Under these circumstances, the State concerned is subject to State responsibility for violation of its obligations under the Articles if the proposed activity poses a significant risk of environmental damage to other States.

Due to the hazards associated with the use of nuclear energy, the authorization for the use of nuclear energy for civilian ends has remained under the control of governments in order to ensure that the associated risks are acceptable.[143] Thus before commencing the construction of a nuclear installation an authorization must be issued by the government authorities under the national law of the State in order to implement its obligations under international law.[144] This authorization is based on a preliminary description and safety analysis report provided by the applicant[145] and is examined by the public authorities concerned.[146] The licence conditions are established by the

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[136] Article 6 (1) of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.
[137] Summary Records for the Meeting of the Forty-Sixth Session, YILC, 1994, Vol. I, at p. 236, para. 88.
[138] Article 6 (2) of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.
[139] Article 6 (3) of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.
[140] Article 6 of the ILC Draft Articles on prevention of transboundary harm.
[141] See Articles 2 (ii), (iii) and 7 (ii) of the 1994 Nuclear Safety Convention.
[142] YILC, 1993, Vol. II, Part Two, at p. 27, para. 141.
[143] Muntzing et al., NLB, No. 17, 1975, at p. 35.
[144] YILC, 1994, Vol. I, at p. 236, para. 88.
[145] Vilnius, 2007, at p. 74.
[146] Article 2 (iii) of the 1994 Convention on Nuclear Safety.

regulatory body after consultation with the applicant.[147] To issue a decision in the matter, the competent authorities must ensure that the rules concerning the radiological protection of workers and the permissible maximum limits of radioactive substances released into the environment are not violated and that an EIA has been carried out.[148] The authorities must also review the required conditions for the selection of the installation site, reactor design, nuclear safety, operation of the installation, etc.[149] The public authorities concerned supervise and inspect the implementation of the license conditions by the operator of the installation during operation. For example, the 1962 Nuclear Ships Convention[150] obliges a contracting State to implement the necessary procedures to prevent the operation of any nuclear ship carrying its flag without registration or authorization.[151] Accordingly, a State may not allow unauthorized nuclear activity vis-à-vis the procedures required or an activity that violates the conditions specified.[152] In the MOX Plant Case, Ireland requested the Tribunal to order the UK to immediately suspend the authorization or prevent the operation of the plant,[153] because the process of the authorization of the MOX plant was, according to Ireland, badly flawed by the UK and inconsistent with its obligations under the LOSC.[154]

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[147] Stoiber, Baer, Pelzer and Tonhauser, 2003, at p. 71.

[148] Elena Molodstova, "Nuclear Energy and Environmental Protection: Responses of International Law", in: PELR, Vol. 12, Issue 1, 1994, pp. 185-267, at p. 191; Vilnius, 2007, at pp. 35-36; "Finnish Report on The Safety of Spent Fuel and Radioactive Waste Management: Finnish National Report as referred to in Article 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, STUK-B-YTO 223 / APRIL 2003, at p. 21, available at: http://www.stuk.fi/julkaisut/stuk-b/stuk-b-yto223.pdf (accessed on 19.11.2010).

[149] Burns, NLB, No. 81, 2008, pp. 7-29.

[150] For the text of The 1962 Brussels Convention on the Liability of Operators of Nuclear Ships, available at: http://www.jstor.org/stable/2196215 (accessed on 16.10.2010). For literature, see Peider Könz, "The 1962 Brussels Convention on the Liability of Operators of Nuclear Ships", in: AJIL, Vol. 57, No. 1, 1963, pp. 100-111.

[151] Article XV (1) of the 1994 Nuclear Ships Convention provides that '[e]ach Contracting State undertakes to take all the measures necessary to prevent a nuclear ship flying its flag from being operated without a license or authority granted by it'.

[152] Article 7 (ii) of the 1994 Nuclear Safety Convention.

[153] International Tribunal for the Law of the Sea Year 2001, The MOX Plant Case, Order, para. 27 (1) of the 3 December 2001 Order. The Order is available at: http://www.itlos.org/start2_en.html (accessed on 8.6.2010).

[154] "Request for Provisional Measures and Statement of Case Submitted on Behalf of Ireland",
http://www.itlos.org/fileadmin/itlos/documents/cases/case_no_10/request_ireland_e.pdf (accessed on 14.8.2012).

5.2.1.5 Ensuring the safety of nuclear reactor installations

Nuclear safety is a fundamental issue in relation to the construction and operation of nuclear power plants.[155] Every nuclear power plant is subject to supervision and inspection by national regulatory bodies to ensure the safety of the plant in every phase of the nuclear fuel cycle.[156] This includes the processes of design, construction, commissioning, test operation, repair and maintenance, plant promotion, radiation exposure of workers, transport of nuclear substances, decommissioning of the installation and waste management and disposal.[157] The primary goal of nuclear safety is to keep the exposure of workers, populations and the environment to radiation from a nuclear installation as low as reasonably possible during the normal operation of the installation as well as in the event of a nuclear accident.[158] Therefore, every country operating nuclear installations is obliged to establish a legal framework concerning nuclear safety to regulate the nuclear industry during the course of performing these processes.[159] The operator of a nuclear installation is accountable for the safety of the installation in every phase of the nuclear fuel cycle.[160] However, the implementation of these regulations is also subject to supervision and inspection by the competent authorities of the State.[161] Thus the roles of the operating body and the licensing authorities are related and share the same purpose, i.e., the safe operation of the installation

[155] NEA, Achieving Nuclear Safety, 1993, at p. 3.
[156] Nuclear Safety Review, IAEA 1992, at p. 64.
[157] Nuclear Safety Review, IAEA 1992, at p. 64.
[158] Molodstova, PELR, Vol. 12, No. 1, 1994, pp. 185-267, at p. 191.
[159] IAEA, "Promoting Safety in Nuclear Installations", at p. 1, available at: http://www.iaea.org/Publications/Factsheets/English/safetynuclinstall.pdf (accessed on 18.2.2012).
[160] Molodstova, PELR, Vol. 12, No. 1, 1994, at p. 191; Sam Emmerechts, Christian Raetzke and Benjamin Okra, "Legal and Regulatory Aspects of long-Term Operation of Nuclear Power in OECD Member Countries", in: NLB, No. 87, pp. 45-71, at p. 56. It was stated that, '[t]he licensee retains the prime responsibility for safety throughout the lifetime of facilities and activities, and this responsibility cannot be delegated. Other groups, such as designers, manufacturers and constructors, employers, contractors, and consignors and carriers, also have legal, professional or functional responsibilities with regard to safety'. See "IAEA Safety Standards for Protecting People and the Environment: Fundamental Safety Principles", Jointly sponsored by EURATOM, FAO, IAEA, ILO, IMO, OECD/NEA, PAHO, UNEP, WHO, Safety Fundamentals, No.SF-1, IAEA Vienna 2006, IAEA Doc. STI/PUB/1273 (2006) at p. 6, available at: http://www.intoeternitythemovie.com/assets/Pdf/IAEASafetyStandards.pdf (accessed on 22.2.2012).
[161] Stoiber, Baer, Pelzer and Tonhauser, 2003, at p. 65.

for the protection of the installation itself, as well as the workers, the population living outside the plant, and the environment.[162]

According to international law, the duty to control and maintain safety in a nuclear installation is aimed at avoiding nuclear accidents and the resulting damage.[163] Nuclear installations are always constructed and operated under strict nuclear safety standards, but systems of nuclear safety and operating techniques vary from country to country according to the type of reactor.[164] An international system of inspection has therefore been established under the auspices of international organizations to ensure that safety measures for nuclear installations are implemented in accordance with international nuclear safety standards.[165] Similarly, international standards for the design, construction and operation of nuclear installations have also been established.[166] The aim of these standards is to ensure that all nuclear installations are constructed and operated in accordance with uniform procedures and codes which ensure the safety of the installation.[167] The regulatory body re-

[162] Massera, IAEA Legal Series, No. 5, 1969, at p. 184.

[163] Duncan E. J. Currie, "The Right to Control Passage of Nuclear Transport Vessels Under International Law", in: GELA, Vol. 4, 1996, pp. 54-94, at pp. 80-81.

[164] Molodstova, PELR, Vol. 12, No. 1, 1994, at p. 193.

[165] For the licensing systems and inspection of nuclear installations in the OECD countries, see the study prepared by the OECD/NEA, "Licensing Systems and Inspection of Nuclear Installations", study prepared in collaboration with the Committee on the Safety of Nuclear Installations, OECD Paris 1986.

[166] "IAEA Safety Standards: Protecting People and the Environment", available at: http://www-ns.iaea.org/standards/ (accessed on 27.2.2012); IAEA, "Planning, Managing, Organizing the Decommissioning of Nuclear Facilities: Lessons Learned", IAEA, Vienna 2004, available at: http://www-pub.iaea.org/books/iaeabooks/7053/Planning-Managing-and-Organizing-the-Decommissioning-of-Nuclear-Facilities-Lessons-Learned (accessed on 19.2.2012); IAEA, "Site Evaluation of Nuclear Installations: Safety Requirements", IAEA Safety Standards Series No. NS-R-3, Vienna 2003, available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1177_web.pdf (accessed on 19.2.2012); IAEA, "Disposal of Waste from the Cleanup of Large Areas Contaminated as a Result of a Nuclear Accident", Technical Reports Series No. 330, IAEA Vienna, 1992, available at: http://www.iaea.org/OurWork/ST/NE/NEFW/Technical_Areas/WTS/documents/Post_accident_documents/Disposal_of_waste_from_cleanup_large_areas_after_accidenttrs330.pdf (accessed on 19.2.2012); L. Manning Muntzing, Partner, LeBoeuf, Lamb, Leiby and MacRae, "Philosophical Goals of Nuclear Regulation", in: NLB, No. 17, 1976, pp. 35-45; IAEA, "Promoting Safety in Nuclear Installations", periodical, IAEA Factsheets, available at http://www.iaea.org/worldatom/Periodicals (accessed on 18.2.2012).

[167] W. K. Davis et al., "United States Light-Water Reactors: Present Status and Future Prospects", in: UN and IAEA, Peaceful Uses of Atomic Energy, Proceedings of the

views and assesses the application of the nuclear safety standards and ensures that the installation complies with the applicable safety objectives and requirements for the setting, design, construction, manufacture, commissioning, operation, decommissioning and closure of a waste disposal installation.[168]

These international organizations also created programs establishing international cooperation in the field of nuclear energy in order to impose unified rules of safety and operation of nuclear installations on the industrialized countries.[169] Under the IAEA Statute, the IAEA has the authority and responsibility to control nuclear installations that are in operation to ensure that the nuclear safety standards are applied[170] and that these installations are not used for non-peaceful purposes.[171] However, this is subject to an agreement between the IAEA and the Installation State, and without that agreement the IAEA does not have the right to inspect a nuclear installation.[172] This is because 'governments are normally sensitive to authoritative fact-finding missions given the credibility attached to their reports and the effects of any adverse publicity resulting therefrom. For this reason very few treaties in international law, and more specifically in the environmental context, contain provisions for compulsory inspection'.[173] Accordingly, safety regula-

Fourth International Conference, Geneva, 6-16 September 1971, jointly sponsored by the UN and the IAEA, Vol. 2, Vienna/New York, 1972, pp. 21-43, at p. 21.

[168] IAEA, "Review and Assessment of Nuclear Facilities by the Regulatory Body", IAEA Safety Standards Series, Safety Guide No. GS-G-1.2, IAEA Vienna 2002, at pp. 6-10, available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1128_scr.pdf (accessed on 27.2.2012).

[169] NEA, Achieving Nuclear Safety, 1993, at p. 3.

[170] Reinhard H. Rainer and Paul C. Szasz, "The Law and Practices of the International Atomic Energy Agency 1970-1980", Supplement 1 to the 1970 Edition of Legal Series No. 7, IAEA Vienna 1993, at p. 422. Under Article III.A.6 of its Statute, the IAEA is authorized '[t]o establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property (including such standards for labour conditions), and to provide for the application of these standards to its own operation as well as to the operations making use of materials, services, equipment, facilities, and information made available by the Agency or at its request or under its control or supervision; and to provide for the application of these standards, at the request of the parties, to operations under any bilateral or multilateral arrangements, or, at the request of a State, to any of that State's activities in the field of atomic energy'. The IAEA Statute is available at: http://www.iaea.org/About/statute_text.html#A1.3 (accessed on 19.2.2012).

[171] Article XII A (1) of the IAEA Statute.

[172] See Articles III (3), XI, XII of the IAEA Statute.

[173] Okowa, 2000, at p. 242.

tion of nuclear installations is a national responsibility[174] under which 'States have an obligation of diligence and duty of care, and are expected to fulfil their national and international undertakings and obligations. International safety standards provide support for States in meeting their obligations under general principles of international law, such as those relating to environmental protection'.[175]

Thus IAEA nuclear safety standards are considered to be the cornerstone of an international nuclear safety and security mechanism which provides the basis for States to perform their duties relating to nuclear safety.[176] Nevertheless, they are not binding on the Member States; they are only binding on the IAEA itself in relation to nuclear installations operated by it and on Member States in relation to IAEA-assisted operations.[177] They become obligatory for the States in the event that these standards are included in an international agreement between the agency and the State which requested assistance from it.[178] Therefore, in the 1986 Conference held after the Chernobyl accident, IAEA Member States discussed the possibility of establishing an obligatory regime for nuclear safety which entitles the IAEA to in-

[174] IAEA, "IAEA Safety Standards for Protecting People and the Environment: Radiation Safety of Gamma, Electron and X Ray Irradiation Facilities", Specific Safety Guide No. SSG-8, IAEA Vienna 2010, at p. V, available also at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1454_web.pdf (accessed on 23.2.2012).

[175] See "Background", IAEA "IAEA Safety Standards for Protecting People and the Environment: Compliance Assurance for the Safe Transport of Radioactive Material", Safety Guide No. TS-G-1.5, IAEA Vienna, 2009, at p. i, available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1361_web.pdf (accessed on 19.2.2012).

[176] "Strategies and Processes for the Establishment of IAEA Safety Standards (SPESS)", Version 1-7 April 2010, at p. 11, available at: http://www-ns.iaea.org/downloads/standards/spess.pdf (accessed on 23.8.2010).

[177] The IAEA issued a number of recommendations related to nuclear safety: see in general, IAEA, "Recommendations for the Safe Use and Regulation of Radioactive Sources in Industry, Medicine, Research and Teaching", Safety Series No. 102, Vienna 1990, available at: http://www-pub.iaea.org/books/IAEABooks/3678/Recommendations-for-the-Safe-Use-and-Regulation-of-Radiation-Sources-in-Industry-Medicine-Research-and-Teaching (accessed on 29.2.2012). (issuing recommendations related to nuclear safety); IAEA, "IAEA Safety Standards for Protecting People and the Environment: Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants", Specific Safety Guide No. SSG-4, IAEA Vienna 2010), at p. X. It is also available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1443_web.pdf (accessed on 23.2.2012).

[178] Paul C. Szasz, "The IAEA and Nuclear Safety", in: RECIEL, Vol. 1, No. 2, 1992, pp. 165-172, at p. 169.

spect nuclear installations and to apply nuclear safety standards.[179] This was reflected in international conventions adopted after this Conference which involved similar obligations to those of the nuclear safety standards.[180] As a result, nuclear safety has been strengthened and developed with the adoption of the 1994 Convention on Nuclear Safety[181] and the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.[182] Both instruments were adopted under the auspices of the IAEA to supplement the IAEA nuclear safety standards and to make them binding on the Contracting Parties.[183] According to the 1994 Nuclear Safety Convention, the Contracting Parties are obliged to provide annual reports to prove they have implemented the obligations of the Convention,[184] and to hold periodic meetings to discuss and review the content of the re-

[179] 'Shortly before the Chernobyl accident the IAEA set up a Committee of Experts to draw up safety guidelines for nuclear power construction and operation, and its expanded programme'. Hancher and Cameron, at p. 183. After the Chernobyl accident, the IAEA General Conference adopted two resolutions (GC(SPL.I)/RES/1 and GC(SPL.I)/RES/2) at its first special session on 26 September 1986 and adopted resolution GC(XXX)/RES/468 on 3 October 1986 at its thirtieth regular session, to increase the role of IAEA in the application of nuclear energy for peaceful uses and strengthen the safety of nuclear installations. UNGC resolution, A/RES/41/36, adopted on 11 November 1986, 66th plenary meeting, available at: http://www.un.org/documents/ga/res/41/a41r036.htm (accessed on 7.5.2012); Okowa, 2000, at p. 243. The 'IAEA member states have also considered the possibility of obligatory international minimum safety standards for reactors, but have not reached agreement'. Birnie and Boyle, 1992, at p. 353; '[I]t would be preferable that any framework convention on nuclear safety be comprehensive, and include all aspects of an international safety regime in one document. This means including liability, which is an inherent aspect of safety and which is the legal consequence of the duty to prevent damage'. La Fayette, NLB, No. 50, 1992, at p. 26.

[180] IAEA, Specific Safety Guide No. SSG-4, 2010, at p. X.

[181] Convention on Nuclear Safety, July 5, 1994, IAEA Doc. INFCIRC/449, 33 I.L.M. 1518 (1994), IAEA Legal Series, No. 16, 1994, available at: http://heinonline.org/HOL/Page?handle=hein.journals/intlm33&id=1532&collection=journals&index=journals/intlm (accessed on 14.4.2012).

[182] Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, September 5, 1997, 36 I.L.M. 1431 (1997), available at: http://heinonline.org/HOL/Page?handle=hein.journals/intlm36&id=1447&collection=journals&index= (accessed on 14.4.2012).

[183] See IAEA, Specific Safety Guide No. TS-G-1.5, 2009; Johan Rautenbach, Wolfram Tonhauser and Anthony Wetherall, "Overview of the International Legal Framework Governing the Safe and Peaceful Uses of Nuclear Energy-Some Practical Steps-", in: OECD/NEA, 2006, pp. 7-36.

[184] Article 5 of the 1994 Nuclear Safety Convention; IAEA, "Promoting Safety in Nuclear Installations", Periodical, IAEA Factsheets, at p. 2, available at: http://www.iaea.org/worldatom/Periodicals (accessed on 18.2.2012).

port.[185] However, these Conventions do not contain any explicit obligations relating to the inspection of nuclear installations.[186] Despite this, the responsibility for the safety of nuclear installations and for preventing environmental damage caused by these installations to other States remains the responsibility of the Installation State even if such installations are operated by private operators.[187] This is indicated by the fact that the Convention States have provided that 'responsibility for nuclear safety rests with the State having jurisdiction over a nuclear installation'.[188] Therefore the possibility of bringing claims regarding State responsibility for a breach of the State's obligation regarding nuclear safety under public international law is left conspicuously open.[189]

Finally, the existing nuclear liability conventions were designed to compensate victims of nuclear accidents and were not intended to deal with nuclear safety and precautionary measures of nuclear installations.[190] However, there is a growing trend for the nuclear liability conventions to deal with the issues of nuclear safety. According to the Exposé des Motifs of the 1960 Paris Convention, there is a need for an international agreement setting up a regime of third party liability.[191] This agreement supplements the measures applied in the related fields of public health and safety and the prevention of accidents and facilitates the solution of third party liability problems at a national level.[192]

Accordingly, the scope of the nuclear liability regime should be extended to apply not only in the event of damage caused by nuclear accidents, but also to apply in cases of the failure of the operator or the Installation State to

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[185] Article 20 of the 1994 Nuclear Safety Convention.
[186] Article 20 of the 1994 Nuclear Safety Convention.
[187] Layard, RECIEL, Vol. 5, Issue 3, 1996, at p. 222.
[188] Paragraph (iii), the preamble of the 1994 Convention on Nuclear Safety.
[189] Layard, RECEL, Vol. 5, Issue 3, 1996, at p. 222. See in general, Anthony D'Amato and Kristen Engel, "State Responsibility for Exportation of Nuclear Power Technology", in: VLR, Vol. 74, No. 6, 1988, pp. 1011-1066. (detailing State responsibility for ensuring safe nuclear power technology).
[190] The main aim of the nuclear liability conventions is to provide equitable and adequate compensation to victims of nuclear damage caused by nuclear activities. (see the Preambles of the Paris and Vienna Conventions. Convention on Third Party Liability in the Field of Nuclear Energy, preamble, July 29th 1960, http://www.nea.fr/law/nlparis_conv.htm; Vienna Convention for Civil Liability for Nuclear Damage, preamble, March 20, 1996, http://www.iaea.org/Publications/Documents/Infcircs/1996/inf500.shtml; Lefeber, 1996, at p. 236)
[191] Exposé des Motifs of the Paris Convention, para. 3.
[192] Exposé des Motifs of the Paris Convention, para. 3.

take measures for the prevention and mitigation of nuclear damage. In that case, the liability of the operator will remain in the domain of national law, while the liability of the State will be under international law. This point of view is coherent with the special nature of nuclear energy as a hazardous activity that requires extending the scope of nuclear liability to cover all nuclear activities. The failure of the nuclear regulations to cover liability for taking nuclear safety measures in nuclear installations within the scope of the nuclear liability regime is not coherent with the special nature of nuclear energy as well as the new amendments of the nuclear liability conventions and the function of nuclear liability law which are aimed at preventing and minimizing the damage before compensating it.[193] This view is also reflected in the structure of nuclear liability law which indicates that the first line of defence against nuclear accidents is the prevention of a nuclear accident from occurring; the second line of defense is an emergency response that provides early notification and assistance; and finally, if the accident has occurred and damage cannot be prevented, then the persons liable must repair the damage and compensate the victims.[194] In fact, the application of liability regarding safety measures in nuclear installations will induce operators and States to take effective precautionary safety measures in nuclear installations in order to prevent and reduce the risk and consequences of nuclear accidents.[195] This was reflected in the 1997 Convention on Supplemen-

[193] The amended nuclear liability conventions provide for preventive measures to prevent and reduce damage caused by a nuclear accident. See, Article I (k) (iv) and (n), the Vienna Convention on Civil Liability for Nuclear Damage of 21 May 1963 as amended by the Protocol of 12 September 1997; Article I (h) of the 1997 Convention on Supplementary Compensation for Nuclear Damage; Article I (ix) of the 2004 Protocol to The Paris Convention on Third Party Liability in the Field of Nuclear Energy.

[194] NEA, Liability and Compensation, 1994, at p. 9; La Fayette, NLB, No. 50, 1992, pp. 7-35, at p. 26.

[195] Patrick Reyners, "Liability for Nuclear Damage in Eastern Europe and International Co-operation", NEA, Newsletter, Fall 1994, at 13, 17. NEA, Liability and Compensation, 1994, at p. 9 and 21; Lefeber, 1996, at pp. 1-4; Michael G. Faure, "Economic Models of Compensation for Damages Caused by Nuclear Accidents: Some Lessons for the Revision of the Paris and Vienna Conventions" in: International Nuclear Law Association, 1995, 1995, pp. 183-205, at p. 184; Heikki Kolehmainen, "The Modernisation of the International Nuclear Third Party Liability Regime-Does Exclusive Liability Still Make Sense?" in: OECD/NEA, 2000, pp. 453-461, at pp. 458-459; see generally, David D. Caron, "The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research", in: The Hague Academy of International Law, Les aspects internationaux des catastrophes naturelles et industrielles (The International Aspects of Natural and Industrial Catastrophes), report submitted to Centre for Studies and Research in International Law, The Hague Academy of International Law, The Hague

tary Compensation which encourages States to deal with the issues of nuclear safety and to establish 'a worldwide liability regime [that] would encourage regional and global co-operation to promote a higher level of nuclear safety in accordance with the principles of international partnership and solidarity'.[196] This will at least lead to the prevention or reduction of the risks and consequences of nuclear accidents.

5.2.2 The obligations to provide information necessary to prevent and reduce environmental damage

Prior notification, consultation, negotiation and exchange of information between States in the case of conducting hazardous activities are principles related to the cooperation between States in providing the necessary information to prevent and reduce damage caused by the activity.[197] These procedural rules are endorsed by the writers of international law and international instruments as customary and general principles of international law.[198] The Rio Declaration States that, 'States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith'.[199] This Section discusses these obligations in the following 5 subsections respectively: prior notification in Section 5.2.2.1, consultation in Section 5.2.2.2, negotiation in Section 5.2.2.3, exchange of information in Section 5.2.2.4, and providing information to the public in Section 5.2.2.5.

1995, Kluwer Law International, Martinus Nijhoff Publishers, Dordrecht/Boston/London, 1996, at pp. 105-110.

[196] The Preamble of the 1997 Convention on Supplementary Convention.

[197] First report on prevention of transboundary damage from hazardous activities by Pemmaraju Sreenivasa Rao, Special Rapporteur, International Law Commission Fiftieth session Geneva, 20 April-12 June 1998, New York, 27 July-14 August 1998, United Nations General Assembly, doc. A/CN.4/487/Add.1, at pp. 8-12, Paras. 22-38, available at: http://untreaty.un.org/ilc/documentation/english/a_cn4_487_add1.pdf (accessed on 22.4.2012); Owen McIntyre, "The Role of Customary Rules and Principles in the Environmental Protection of Shared International Freshwater Resources", in: NRJ, Vol. 46, Issue 1, 2006, pp. 157-210, at pp. 177-179, available also at: http://www.esil-sedi.eu/fichiers/en/McIntyre_937.pdf, at pp. 15-16, (accessed on 20.2.2012); Article 18 of the "Berlin Rules on Water Resources", adopted by the International Law Association, Berlin Conference (2004), Water Resources Law, available at: http://www.cawater-info.net/library/eng/l/berlin_rules.pdf (accessed on 17.10.2010).

[198] Farrajota, 2005, at p. 305.

[199] Principle 19 of the 1992 Rio Declaration.

5.2.2.1 Prior notification

Before conducting a nuclear activity the Installation State must provide prior notification to the States likely to be affected by the activity so that they can take precautionary measures to protect their environment from potential resulting damage.[200] This notification also gives the Installation State the opportunity to modify its own interests in the light of those of the notified States.[201] However, this gives rise to certain questions. When should the notifying State provide the notification to the notified State? When should the latter respond? Which States should be notified? What type of information should be provided by the notifying State? The answers to these questions must be accurate in relation to conducting hazardous activities and in particular with regard to the use of nuclear activities. The rationale behind these questions is that information concerning nuclear technology is important and not easy to provide or share with other States, because such information relates to industrial secrets and national security.[202] On the other hand, risks arising from the use of such technology are very high and damage caused by this industry can reach far beyond the border of States, potentially affecting distant States and their environments. As mentioned above, the radioactivity caused by the Chernobyl accident spread all over the world.[203] Does this mean that the Installation State should notify the whole world to provide it with the necessary information about the planned activity or should it only notify the neighbouring States?

In fact, due to the importance of this matter many of the conventional regimes established to organize hazardous activities embodied provisions related to the information about the planned activity.[204] It was presumed that

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[200] Barboza, RDC, Vol. 247, Part III, 1994, at p. 335; Thaqal S. Al-Ajmi, "Maritime Transport of Environmentally Damaging Materials: A Balance between Absolute Freedom and Strict Prohibition", in: LEDJ, Vol. 3, No. 1, 2007, pp. 40-53, at p. 49, available at: http://www.lead-journal.org/content/07040.pdf (accessed on 10.1.2011).

[201] Okowa, 2000, at p. 136.

[202] Report of the Commission to the General Assembly on the work of its forty-fifth session, YILC, 1993, Vol. II, Part Two, at p. 27, para. 145 and p. 30, para. 172; Article 17 of the 1993 Draft Articles on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law.

[203] NEA Secretariat, NLB, No. 39, 1987, pp. 58-65; Rasmussen, 1994.

[204] See of example Article V (2) of the Agreement between the Government of Canada and the Government of the United States of America on Air Quality, Done at Ottawa on 13 March 1991, entered into force on 13 March 1991, 1852 U.N.T.S. 79, available also at: http://www.epa.gov/ttn/caaa/gen/uscanad.pdf (accessed on 16.2.2010), reprinted in Weiss, Magraw and Szasz (eds.), 1992, p. 263. Annex II (3) of the 1985 Convention for the Protection of Ozone Layer; Article 14 of the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Nov. 7, 1996,

once the Installation State has planned to conduct a hazardous activity which has potential risks for other States, it should immediately notify the other States which might be affected by the activity.[205] The Installation State should notify the affected States within a limited period of time when damage resulting from the planned activity is foreseeable.[206] The notification should include the available technical information about the primary assessment of the activity.[207] Also, 'an essential condition for notification is the determination of a certain degree of transboundary damage'.[208] Accordingly, for example, '[e]very State should take the appropriate steps necessary to ensure that, subject to the relevant norms of international law, the international transboundary movement of radioactive waste takes place only with the prior notification and consent of the sending, receiving and transit States in accordance with their respective laws and regulations'.[209]

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36 ILM 1 (1997); Article 11 of the 1973 Convention for the Prevention of Pollution from Ships, XII ILM 1319 (1973); Article 11 of the 1978 Protocol Relating to the International Convention for the Prevention of Pollution from Ships, done at London on 17 February 1978, available at: http://sedac.ciesin.org/entri/texts/acrc/marpolp.txt.html (accessed on 13.4.2012); Article 198 of the 1982 United Nations Convention on the Law of the Sea, 10 December 1982, 1833 U.N.T.S. 397; Article 14 of the 1995 Agreement for the Implementation of the Provisions of UNCLOS Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 4 December 1995, 34 I.L.M. 1542 (1995); Article 13 of the 1995 Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, as revised in Barcelona in 1995, 10 June 1995, OJ, L 322/34, 14.12.1999; Article 7 of the Protocol Concerning Co-operation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea, adopted in Malta on 25 January 2002, entered into force on 17 March 2004, available at: http://ec.europa.eu/world/agreements/prepareCreateTreatiesWorkspace/treatiesGeneralData.do?step=0&redirect=true&treatyId=886 (accessed on 18.4.2012).

[205] Hanqin, 2003, at p. 168.

[206] Article 5 of the "Rules on Water Pollution in an International Drainage Basin" adopted by the International Law Association at the Montreal Session on 4 September 1982.

[207] Report of the International Law Commission on the work of its fifty-third session, Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, with commentaries, 2001, Article 8 and comments, at pp. 159-160, available at: http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_7_2001.pdf (accessed on 26.8.2010), reprinted in YILC, 2001, Vol. II, Part Two.

[208] Hanqin, 2003, at p. 171.

[209] *See* International Atomic Energy Agency, General Conference Resolution GC(XXXIV)/RES/530 on Code of Practice on the International Transboundary Movement of Radioactive Waste, principle 5, Sept. 21, 1990, 30 ILM 556 (1991), available at: http://www.jstor.org/pss/20693549 (accessed on 18.10.2010); Nuclear power, available at: http://www.globelaw.com/Nukes/iaeacod.htm (accessed on 18.10.2010); IAEA doc.

Thus, logically, notification should be provided to the surrounding and neighboring States. This is indicated in agreements concluded between Installation States and their respective border States, such as the Agreement on Co-operation in Respect of the Safety of Nuclear Installations Located in Areas Near the Border between Spain and Portugal, signed in Lisbon on 31 March 31 1980.[210] According to that agreement, the competent authorities of the constructing State should notify and supply the neighbouring State, upon its request, with information regarding the authorization for the setting, construction and operation of nuclear installations in the border area.[211] The notification should be accompanied by documentation concerning the nuclear safety and radiological protection of the authorized installation.[212] It should be provided in sufficient time to permit any comments and observations from the neighbouring country before the relevant decision is made by the competent authorities of the constructing State.[213] The competent authorities of the neighbouring State are obliged to examine the documentation received without delay.[214] The agreement also establishes an obligation upon the authorities of the neighbouring State to provide, in due time, any necessary information requested by the constructing State for the evaluation of the setting, construction or operation of the installation, both while the authorization is pending and during the operation of the installation.[215]

Another example of such an agreement is the Agreement between Denmark and the Federal Republic of Germany Relating the Exchange of Information on Construction of Nuclear of Nuclear Installations Along the Bor-

INFCIRC/386, 13 November 1990, available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/inf386.shtml (accessed on 18.10.2010). Also see Odette Jankowitsch, "A Code of Practice on the International Transboundary Movement of Radioactive Waste: Countries Adopt a Global Response to the Alleged "Dumping" of Radioactive Waste", in: IAEA Bulletin, No. 4, 1990, pp. 28-31, available at: http://www.iaea.org/Publications/Magazines/Bulletin/Bull324/32402682831.pdf (accessed on 20.2.2012).

[210] Agreement on Co-operation in Respect of the Safety of Nuclear Installations Located in Areas Near the Border Between Spain and Portugal, Spain - Port., Aug. 19, 1980, 1248 U.N.T.S. 63, 64 United Nations Treaty Series 1981, No. 20356, [hereinafter *Spain Treaty]*.

[211] Article 2 of the 1980 Agreement between Spain and Portugal.

[212] OKOWA, 2000, at p. 136; Article 3 of the 1980 Agreement between Spain and Portugal.

[213] Report of the Commission to the General Assembly on the Work of its Forty-Fifth Session, [1993], YILC, 1993, Part II, paras. 149, 172, U.N. Doc. A/CN.4/SER.A/1993; Article 3 of the 1980 Agreement between Spain and Portugal.

[214] Article 3 of the 1980 Agreement between Spain and Portugal.

[215] Article 4 of the 1980 Agreement between Spain and Portugal.

der, which was signed by the two parties on 4 July 1977.[216] This agreement is aimed at the cooperation between the two parties regarding the safety of nuclear installations and the protection of the environment from damage caused by nuclear accidents, in the case of the construction of a nuclear installation within thirty kilometres of the border of either party. The agreement also obliges the parties to provide and exchange the relevant information and to consult each other when they decide to construct and operate nuclear installations for the purpose of the production, processing, reprocessing, manufacture or fission of nuclear fuels between thirty and one hundred kilometers from their borders.[217] The information must include plans and decisions on the setting, construction and operation of such installations and relevant documents and information.[218] Similarly, the Memorandum on Exchange of Information and Consultation on Nuclear Installations Near Borders was adopted by the Federal Republic of Germany and the Netherlands and entered into force on 27 September 1977.[219]

As long as these agreements apply only between the parties concerned, the fact remains that these installations can cause damage to other States far away from the Installation State, as happened in the Chernobyl accident, which had harmful effects on people, property and the environment worldwide.[220] This requires the application of the general rules of international law. The obligations of notification and providing information under these rules were discussed by the ILC during the codification of its Draft Articles on International Liability for acts not prohibited by international law.[221] According to the Special Rapporteur Julio Bardoza, if the assessment of a hazardous activity indicates a risk of significant transboundary environmental damage, the Installation State should notify other States which are likely to

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[216] Denmark-Federal Republic of Germany: Agreement Regulating the Exchange of Information on the Construction of Nuclear Installations Along the Border, Den. – Fed. Rep. of Ger., Done at Bonn and Copenhagen, 4 July 1977, 17 ILM, 1978, at p. 274.

[217] See Articles 1 and 2 of the 1977 Agreement between Denmark and Germany; NLB, No. 22, 1978, at p. 34.

[218] See Articles 1, 2 and 3 of the 1977 Agreement between Denmark and Germany; NLB, No. 22, 1978, at p. 35.

[219] NEA, NLB, No. 22, 1978, at p. 35.

[220] Able J. González, "The Radiological Health Consequences of Chernobyl: The Dilemma of Causation", in: OECD/NEA and IAEA, 1993, pp. 25-55; NEA, 1996; Rasmussen, 1994; Presidential Commission on Catastrophic Nuclear Accidents, Vol. One, August 1990, at pp. 76-78.

[221] Second report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Mr. Julio Barboza, Special Rapporteur, UN. Doc. A/CN.4/402, YILC, 1986, Vol. II, Part One, A/CN.4/SER.A/1986/Add.l (Part 1), at pp. 152-153, paras. 35-39.

be affected by the damage and send them the available technical and other relevant information resulting from the assessment.[222] This was affirmed by the ILC Draft Articles on Prevention of Transboundary Harm which declares that the State of origin is obliged to provide other States which are likely to be affected by damage caused by a hazardous activity with the relevant technical information and assessment of the risks.[223] The notification should be provided by the State of origin within a limited period of time after the authorization and the notified State must respond within six months of the notification.[224] This was also provided in the 1997 Watercourses Convention, which states that the notified State must study and evaluate the possible affects of the planned measures and reply within six months, though the period may be extended by another six months upon the request of the notified State.[225] However, if the notified State has failed to reply within this period, any claim for compensation it makes may be settled by the costs incurred by the notifying State for action undertaken after exhausting the time required for a reply which could have been avoided if the notified State had objected within the prescribed time.[226]

5.2.2.2 Consultation

In the case of the construction of a nuclear facility, the Source State must also consult the States likely to be affected by the activity to establish a mechanism and to reach acceptable solutions regarding the necessary measures to prevent potential environmental damage caused by these installations.[227] Because nuclear damage may affect other States and the public, the Source State is obliged under international law to consult other States, particularly neighbouring States and the public and to supply them with the necessary information and prior notification of the proposed nuclear activity

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[222] Barboza, RDC, Vol. 247, Part III, 1994, at p. 335.

[223] Article 8 (1) of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.

[224] Article 8 (2) of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.

[225] Article 13 of the 1997 UN Convention on Non-Navigation Uses of International Watercourses, available at: http://www.un.org/documents/ga/res/51/ares51-229.htm (accessed on 18.4.2012).

[226] Article 16 (2) of the 1997 UN Convention on Non-Navigation Uses of International Watercourses.

[227] Report of the International Law Commission on the work of its fifty-third session, Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, with commentaries, 2001, Article 9, at p. 160, available at: http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_7_2001.pdf (accessed on 26.8.2010) For the report also see, YILC, 2001, Vol. II, Part Two; Article 13 of the 1997 UN Convention on Non-Navigation Uses of International Watercourses.

and to negotiate in good faith regarding the plans of the proposed activity.[228] For example, the rejection of the Government of Austria of the plans of the Swiss Government to construct a 900 megawatt nuclear power plant close to the Austrian border near Rüthi, in the Upper Rhine Valley, led to the Government of Switzerland consulting with the Government of Austria to reach an acceptable solution which satisfied both countries and to resolve the differences between them regarding the construction of the plant.[229]

The ILC Draft Articles on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law imply that the duty of consultation is an effective tool to prevent and minimize the risk of causing significant transboundary harm.[230] The Draft Articles oblige the Source State to consult with other States regarding the necessary measures to prevent significant harm which might be caused by such activities.[231] The provisions regarding consultation on preventative measures were consolidated in the 2001 ILC Draft Articles on Prevention of Transboundary Harm.[232] The consultations must be conducted prior to the authorization and the commencement of the planned activity or during its performance.[233] These consultations should be based on the principle of an equitable balance of interests.[234] To reach an equitable balance of interests, the parties must take into account all the significant factors and circumstances during the

[228] Nanda and Pring, 2003, at p. 55; Rosemary Lyster and Adrian J. Bradbrook, "Energy Law and the Environment", Cambridge University Press, Cambridge, New York, 2006, at pp. 39-40.

[229] International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, 1985, YILC, 1985, Vol. II, Part One, at p. 26, para. 112, A/CN.4/SER.A/1985/Add.l (Part 1/Add.l)

[230] Report of the International Law Commission on the work of its forty-fifth session, Article 18 of the "International Liability for Injurious Consequences Arising Out of Acts Not prohibited by International Law", YILC, 1993, Vol. II, Part Two, at p. 31, paras. 175-176; Barboza, RDC, Vol. 247, Part III, 1994, at p. 336.

[231] Article 18 of the ILC Draft Articles, see report of the ILC on the work of its forty-sixth session, 2 May-22 July 1994, to the General Assembly, Supplement No. 10 (A/49/10), at pp. 160 and 174, available at: http://untreaty.un.org/ilc/documentation/english/A_49_10.pdf (accessed on 24.10.2010), reprinted in YILC, 1994, Vol. II, Part Two, at pp. 160 and 174.

[232] Article 9 (1) of the 2001 the ILC Draft Articles on Prevention of Transboundary Harm.

[233] YILC, 2001, Vol. II, Part Two, at p. 160.

[234] See Article 9 (2) of the 2001 Draft Articles on prevention of transboundary harm; Article 20 of the "International Liability for Injurious Consequences Arising Out of Acts Not prohibited by International Law", YILC, 1993, Vol. II, Part Two, at p. 32.

consultations.[235] However, if the consultations fail, the State of origin must take the interests of the State likely to be affected into account if it has decided to authorize the operation of the proposed activity.[236]

However, to resolve the matter satisfactorily the consultation must be carried out in good faith.[237] Special Rapporteur Barboza argues that consulting in good faith is essential to regimes of that nature.[238] It helps the States concerned to consult each other with the aim of finding a regime that will reconcile their interests.[239] The consultation can take the form of bilateral meetings if there is only one affected State or of multilateral meetings if there is more than one affected State.[240] Consultation between States is important regarding the construction and operation of border installations, particularly nuclear installations, to enable other States to enact legislation and to take precautionary measures to protect people, property and the environment. Thus the duty of consultation is interrelated with the duty of the balance of interests of States and enables the States concerned to establish a regime for the proposed activity which reconciles their interests.[241] This was indicated by the ILC in its Draft Articles on International Liability for Acts Not Prohibited by International Law, which included provisions on protecting the rights of States likely to be affected and the legitimate balance of interests of States.[242] These provisions also were embodied in Article 10 of the

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[235] Article 10 of the 2001 the ILC Draft Articles on Prevention of Transboundary Harm; Article 6 of the Convention on the Law of the Non-navigational Uses of International Watercourses; Report of the International Law Commission on the work of its fifty-third session, Draft articles on Prevention of Transboundary Harm from Hazardous Activities, with commentaries, 2001, at p. 162.

[236] Article 9 of the 2001 the ILC Draft Articles on Prevention of Transboundary Harm.

[237] YILC, 1985, Vol. II, Part One, at p. 25, para. 109, A/CN.4/SER.A/1985/Add.l (Part 1/Add.l)

[238] Report of the International Law Commission, 42nd Session, 1 May-20 July, 1990, para. 498, UN Doc. A/45/10; GAOR, 45th Sess., Supp. No. 10 (1990). YILC, 1990, Vol. II, Part Two, at p. 97, para. 498.

[239] YILC, 1993, Vol. II, Part Two, at p. 31, para. 179; First Report on Prevention of Transboundary Damage from Hazardous Activities by Pemmaraju Sreenisava Rao, Special Rapporteur, International Law Commission, Fiftieth session, Geneva, 20 April-12 June 1998, New York, 27 July-14 August 1998, UN General Assembly doc. A/CN.4/487/Add.1, at p. 11, para. 4.

[240] YILC 1990, Vol. II, Part One, at p. 93, para. 36; YILC, 1990, Vol. II, Part Two, at p. 97, para. 498.

[241] YILC 1990, Vol. II, Part One, at p. 93, para. 36.

[242] Article 18 of the ILC Draft Articles, see report of ILC on the work of its forty-sixth session, 2 May-22 July 1994, to the General Assembly, Supplement No. 10 (A/49/10), at pp. 160 and 174, available at:

ILC Draft Articles on Prevention of Transboundary Harm, which provides for a number of factors involved in an equitable balance of interests.[243] According to Barboza:

> 'There does not seem to be, then, any customary rule obliging a State to require the [… prior] consent of presumably affected States in order to conduct, or authorise private operators to conduct, such activities. However, international practice has imposed some participation of the presumably affected States through certain procedures, particularly at the beginning of the development of the activity'.[244]

The duty of consultation is reflected in international practice and is embodied in bilateral and multilateral agreements, as well as judicial decisions, including, for example, the 1982 UNCLOS;[245] the 1979 Convention on Long-Range Transboundary Air Pollution;[246] the Paris Convention for the Prevention of Marine Pollution from Land-based Sources;[247] and the Agreement

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http://untreaty.un.org/ilc/documentation/english/A_49_10.pdf (accessed on 24.10.2010), reprinted in YILC, 1994, Vol. II, Part Two, at pp. 160 and 174.

[243] Article 10 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities provides that:

'In order to achieve an equitable balance of interests as referred to in paragraph 2 of article 9, the States concerned shall take into account all relevant factors and circumstances, including:

(*a*) The degree of risk of significant transboundary harm and of the availability of means of preventing such harm, or minimizing the risk thereof or repairing the harm;

(*b*) The importance of the activity, taking into account its overall advantages of a social, economic and technical character for the State of origin in relation to the potential harm for the State likely to be affected;

(*c*) The risk of significant harm to the environment and the availability of means of preventing such harm, or minimizing the risk thereof or restoring the environment;

(*d*) The degree to which the State of origin and, as appropriate, the State likely to be affected are prepared to contribute to the costs of prevention;

(*e*) The economic viability of the activity in relation to the costs of prevention and to the possibility of carrying out the activity elsewhere or by other means or replacing it with an alternative activity;

(*f*) The standards of prevention which the State likely to be affected applies to the same or comparable activities and the standards applied in comparable regional or international practice'.

[244] Barboza, RDC, Vol. 247, Part III, 1994, at p. 332.

[245] See Article 142 of the 1982 UNCLOS.

[246] See Article 5 of the 1979 Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 1302 U.N.T.S. 217.

[247] Article 9 of the Convention for the Prevention of Marine Pollution from Landbased Sources, concluded at Paris on 4 June 1974, entered into force on 6 May 1978, 1546 U.N.T.S. 103, (I-26842), 1989.

between the Government of the United States of America and the Government of Canada on Air Quality.[248] According to Article 7 (2) of Directive 2001/42/EC of the European Parliament and of the Council of June 27, 2001 on the Assessment of the Effects of Certain Plans and Programmes on the Environment, 'the Member States concerned shall enter into consultations concerning the likely transboundary environmental effects of implementing the plan or programme and the measures envisaged to reduce or eliminate such effects'.[249]

Nevertheless, with regard to the construction and operation of nuclear installations, the duty of consultation is still narrow in State practice because most State practice is based on bilateral agreements conducted between the neighbouring States. [250]

5.2.2.3 Negotiation

When prior notification has been made and consultation for the intended nuclear activity has been carried out, the Installation State must engage in negotiations with the States likely to be affected by the proposed nuclear activity. Under international law, the duty of negotiation requires the Source State that permits the operation of a hazardous activity within its territory or under its jurisdiction or control to enter into negotiations with other States or States likely to be affected by the activity in order to reach an agreement to establish a mechanism to deal with the situation to avoid the possible damage caused by this activity.[251] The aim of the negotiations is to consider the sub-

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[248] Article XI of the 1991 Agreement between The Government of The United States of America and The Government of Canada on Air Quality, concluded in Ottawa on 13 March 1991, entered into force on 13 March 1991. The text of this Agreement, U.S. EPA/400/1-92/002, available at: http://www.epa.gov/ttn/caaa/gen/uscanad.pdf (accessed on 16.2.2010), reprinted in Weiss, Magraw and Szasz (eds.), 1991, p. 263.

[249] Article 6, Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment, Article 7, 2001 O.J. (L 197) 33; See also Directive 2001/42/EC, of the European Parliament and of the Council of 21 July 2001 on the Assessment of Certain Plans and Programmes on the Environment, Luxembourg, 27 June 2001, PE-CONS 3619/3/01 REV 3, available at: http://www.central2013.eu/fileadmin/user_upload/Downloads/Document_Centre/OP_Resources/04_SEA_directive_2001_42_EC.pdf (accessed on 26.4.2012), 2001 O.J. (L 197), at p. 33; L 197/30 EN Official Journal of the European Communities 21.7.2001, at p. 33; also see Article 6 of this Directive.

[250] Lyster and Bradbrook, 2006, at p. 39.

[251] Van Dyke, DJILP, Vol. 35, No. 1, 2006, pp. 13-46, at p. 21; Franz Xaver Perrez, "Cooperative Sovereignty: Form Independence in the Structure of International Environmental Law", Kluwer Law International, The Hague/London/Boston, 2000, at p. 310; Second report on International Liability for Injurious Consequences Arising Out of Acts

stance of a plan, as well as alternatives and possible compromises, which would oblige the negotiating parties in practice.[252] The negotiations can be based on universal or specific agreements between the States concerned.[253] The principle of negotiation is common in practice.[254] For example, the former Czechoslovakia planned to operate two Soviet-designed 440 megawatt nuclear reactors in Dukovany, close to the Austrian border, by 1980.[255] This led the Austrian Minister of Foreign Affairs to demand negotiations with Czechoslovakia about the safety of the installations, which the government of Czechoslovakia accepted.[256] Another example concerns the negotiations between the governments of Switzerland and Austria about the above-

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Not Prohibited by International Law, by Mr. Julio Barboza, Special Rapporteur, UN. Doc. A/CN.4/402, YILC, 1986, Vol. II, Part One, A/CN.4/SER.A/1986/Add.l (Part 1), at pp. 153-154, paras. 37-41.

[252] Nanda and Pring, 2003, at p. 56.

[253] Laurence Boisson de Chazournes, "Comment: Trends in the Law applicable to Freshwaters", in: Georg Nolte (ed.), Peace Through International Law: The Role of the International Law Commission. A Colloquium at the Occasion of Its Sixties Anniversary, Springer, Dordrecht/Heidelberg/London/New York 2009, pp. 157-172, at p. 159.

[254] 'In 1973, the Belgian Government announced its intention to construct a refinery at Lanaye, near its frontier with the Netherlands. The Netherlands Government voiced its concern because the project threatened not only the nearby Netherlands national park but also other neighbouring countries. It stated that it was an established principle in Europe that, before the initiation of any activities that might cause injury to neighbouring States, the acting State must negotiate with those States. The Netherlands Government appears to have been referring to an existing or expected regional standard of behaviour. Similar concern was expressed by the Belgian Parliament, which asked the Government how it intended to resolve the problem. The Government stated that the project had been postponed and that the matter was being negotiated with the Netherlands Government. The Belgian Government further assured Parliament that it respected the principles set out in the Benelux accords, to the effect that the parties should inform each other of those of their activities that might have harmful consequences for the other member States'. (Belgian Parliament, regular session 1972-1973, *Questions et responses*, bulletin No. 31). YILC, 1994, Vol. II, Part Two, at p. 163, para. 11, footnote 513. Also see the proposal at the Antarctica Minerals Convention for the protection of Antarctica environment, "International Environmental Law: Protection of the marine environment - pollution by ships - dumping of wastes at sea - land-based pollution - international conventions - constitutional arrangements", in: AYIL, pp. 476-485, at p. 482, available at: http://www.austlii.edu.au/au/journals/AUYrBkIntLaw/1988/27.pdf (accessed on 8.5.2012).

[255] Report of the International Law Commission, 46th Session, May 2 – July 22, 1994, n. 514, U.N. Doc. A/49/10; GAOR, 49th Sess., Supp. No. 10 (1994); YILC, 1994, Vol. II, Part Two, at p. 163, para. 11, footnote 514.

[256] YILC, 1985, Vol. II, Part One, at p. 26, para. 112, A/CN.4/SER.A/1985/Add.l (Part 1/Add.l)

mentioned plans of the Swiss Government to construct a 900 megawatt nuclear power plant close to the Austrian border near Rüthi, in the Upper Rhine Valley.[257]

Negotiations can be carried out before or during the course of the activity as indicated in the Agreement on Co-operation in Respect of the Safety of Nuclear Installations Located in Areas Near the Border between Spain and Portugal, signed in Lisbon on 31 March 1980.[258] This Agreement provides that:

> 'If the competent authorities of either country have valid grounds for a complaint regarding questions of nuclear safety and radiological protection, negotiations shall immediately be initiated between such authorities and the competent authorities of the neighbouring country. The competent authorities of the two countries shall endeavour to conclude the said negotiations as quickly as possible'.[259]

The principle of negotiation also finds support in the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses.[260] This Convention requires States to enter into consultation and negotiation in order to find an equitable solution to the situation.[261] In order to reach an equitable solution negotiations must be carried out by the States concerned in good faith.[262] During that period, the notifying State must refrain from implementing or permitting the implementation of the planned measures for a period of six months if so requested by the notified State.[263]

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[257] YILC, 1985, Vol. II, Part One, at p. 26, para. 112, A/CN.4/SER.A/1985/Add.l (Part 1/Add.l)

[258] Agreement on Co-operation in Respect of the Safety of Nuclear Installations Located in Areas Near the Border Between Spain and Portugal, Spain-Port., Mar. 31, 1980, 1248 U.N.T.S 63, 1981, available at: http://untreaty.un.org/unts/60001_120000/8/17/00014825.pdf (accessed on 18.10.2010).

[259] Article 6 of the 1980 Agreement between Spain and Portugal.

[260] *See* General Assembly Resolution 51/229, 99 plenary meeting, 21 May 1997, Annex, Official Records of the General Assembly, A/RES/51/229, Fifty-first Session, Supplement No. 49 (A/51/49), 21 May 1997, available at: http://www.un.org/documents/ga/res/51/ares51-229.htm(accessed on 18.10.2010); for the text of the Convention also see Green Cross International, "National Sovereignty and International Watercourses", Green Cross, 2000, Annex I, available at: http://webworld.unesco.org/water/wwap/pccp/cd/pdf/background_documents/national_sovereignty%20_international_watercourses_2000.pdf (accessed on 7.4.2012).

[261] Article 17 of the 1997 UN Convention on Non-Navigation Uses of International Watercourses.

[262] YILC, 1985, Vol. II, Part One, at p. 25, paras. 109-110, A/CN.4/SER.A/1985/Add.l (Part 1/Add.l)

[263] Article 17 of the 1997 Watercourses Convention.

In the Gabčíkovo–Nagymaros Project Case, the ICJ urged Hungary and Slovakia to negotiate in good faith under the 1977 Treaty in accordance with the principle of *pacta sunt servanda* and to take all necessary measures to ensure that the purpose of the treaty was achieved.[264] Other examples referred to the principle of negotiation are: the 1975 agreement between Canada and the United States relating to weather modifications;[265] the advisory opinion of the Permanent Court of International Justice in 1931 between Lithuania and Poland;[266] and the Tribunal of Arbitration in its award in the Lake Lanoux case in 1957.[267] Furthermore, in the North Sea Continental Shelf and the Fisheries Cases (Federal Republic of Germany/Denmark; Federal Republic of Germany/Netherlands, Judgment of February 20, 1969) the ICJ referred to the obligation of negotiation with the goal of reaching an agreement to resolve the differences between the parties.[268]

5.2.2.4 Exchange of information

The use of nuclear energy as a hazardous activity requires the exchange of information between the States and international organizations concerned, particularly the IAEA, the NEA and EURATOM, in an effort to prevent and reduce transboundary harm caused by a nuclear accident.[269] Providing information helps the international community assess whether or not the Source State has implemented its obligations regarding the protection of the environment.[270] Such information also assists the State parties to understand the nature, extent and harmful environmental consequences and enables them to

[264] Hanqin, 2003, at pp. 174-175.

[265] Agreement between Canada and the United States of America Relating to the Exchange of Information on Weather Modification Activities, signed at Washington and entered into force on 26 March, 977 U.N.T.S. 385 (1975), available at: http://www.lexum.umontreal.ca/ca_us/en/cts.1975.11.en.html (accessed on 18.10.2010).

[266] Railway Traffic between Lithuania and Poland (Railway Sector Landwarów-Kaisiadorys) (Lith. v. Pol.), PCIJ Series, A/B, No. 42, 1931, at p. 116 (October 15).

[267] Lake Lanoux Arbitration (France v. Spain), November 16, 1957, 12 RIAA, 281; 24 ILR, 101, available also at: http://www.ecolex.org/server2.php/libcat/docs/COU/Full/En/COU-143747E.pdf (accessed on 25.3.2012) see at pp. 31, 32 and 34.

[268] ICJ Reports, 1969, at pp. 47-49, paras. 85-87, North Sea Continental Shelf Cases (Ger./Den./Neth.), 1969 (Feb. 20).

[269] For a discussion of the organizations, see Odette Jankowitsch-Prevor, "The Normative Role of the International Atomic Energy Agency (IAEA), Legal Basis and Legal Sources", in: NEA, 2010, pp. 13-30; Julia A. Schwartz, "The OECD Nuclear Energy Agency", in: NEA, 2010, pp. 31-42; Wolfgang Kilb, "The European Atomic Energy Community and its Primary and Secondary Law", in: NEA, 2010, pp. 43-90.

[270] Sands, 2003, at p. 826.

evaluate the effectiveness of preventive measures taken for the protection of the environment in the light of changing scientific evidence.[271]

The duty of exchange of information regarding conducting hazardous activities has become a general and customary principle in international law.[272] The provisions of the principle were codified in the ILC Draft Articles on Prevention of Transboundary Harm, which states that:

> 'While the activity is being carried out, the States concerned shall exchange in a timely manner all available information concerning that activity relevant to preventing significant transboundary harm or at any event minimizing the risk thereof. Such an exchange of information shall continue until such time as the States concerned consider it appropriate even after the activity is terminated'.[273]

The principle of exchange of information is further supported by the nuclear agreements and conventions.[274] For example, according to the 1980 Conven-

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[271] Okowa, BYIL, Vol. 67, 1996, at p. 300.

[272] See Principle 20 of the Stockholm Declaration; Principle 9 of the Rio Declaration; Principle 7 of the 1978 UNEP "Environmental Law Guidelines and Principles on Shared Natural Resources". The principles were drafted in response to United Nations General Assembly Resolution 3129 (X1VllI) of 13 December 1973 by a UNEP working group of legal experts which met between 1976 and 1978, available at: http://www.unep.org/Law/PDF/UNEPEnvironmental-Law-Guidelines-and-Principles.pdf (accessed on 24.2.2010).

[273] Article 12 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.

[274] Memorandum on Exchange of Information and Consultation on Nuclear Installations Near Borders was adopted by the Federal Republic of Germany and the Netherlands and entered into force on 27 September 1977, NEA, NLB, No. 22, 1978, at p. 35, See also, Safety and Siting of Nuclear Installations in NEA Member Countries, at p. 13, available at: http://www.oecd-nea.org/nsd/docs/1979/csni79-35.pdf (accessed on 11.4.2012), Bernd Ruster, Bruno Simma and Michael Bock (eds.), "International Protection of the Environment: Treaties and Related Documents", Vol. XXVII, Oceana Publications, INC. Dobbs Ferry, New York, 1983, pp. 275-278; Denmark–Federal Republic of Germany: Agreement Regulating the Exchange of Information on the Construction of Nuclear Installations along the Border, concluded in Bonn and Copenhagen, July 4, 1977, ILM, Vol. 17, 1978, p. 274; Belgium and France: Convention on Radiological Protection with regard to the Installations of the Ardennes Nuclear Power Station, signed at Paris on 23 September 1966, UNTS, Vol. 588, 1967, p. 227; Switzerland-FRG Agreement on Mutual Information on Construction and Operation of Nuclear Installations in Border Areas, August 10, 1982, [the text in Germany] Bundesgesetzblatt II, 1983, p. 734; Federal Republic of Germany-German Democratic Republic, Radiation Protection Agreement, Agreement on Exchange of Information and Experience in the Field of Radiation Protection, signed on 8th September 1987, in: NLB, No. 40, 1987, p. 44; Agreement between the Government of the Kingdom of Denmark and the Government of the People's Republic of Poland Concerning the Exchange of Information and Co-operation in the Field

tion on the Physical Protection of Nuclear Material, 'as appropriate, the States Parties concerned shall exchange information with each other or international organizations with a view to protecting threatened nuclear material, verifying the integrity of the shipping container, or recovering unlawfully taken nuclear material'.[275] However, the States must take preventive measures for the protection of the confidentiality of any information they have received.[276]

The principle of exchange of information is reflected in almost all environmental treaties which contain provisions on the exchange of information on a regular basis.[277] These treaties contain provisions related to the exchange of information in general or in specific matters.[278] For example, Article 200 of

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of Nuclear Energy Safety and Radiation Protection, 22nd December 1987, in: NLB, No. 41, 1988, pp. 49-53.

[275] Article 5 (2) (b) of the1980 Convention on the Physical Protection of Nuclear Material, 3 March 1980, 1456 U.N.T.S. 24631, *IAEA Doc. INFCIRC/274/Rev.1, May 1980*, available also at: http://www.iaea.org/Publications/Documents/Infcircs/Others/inf274r1.shtml (accessed on 1.4.2012).

[276] Article 6 of the 1980 Convention on the Physical Protection of Nuclear Material.

[277] Okowa, BYIL, Vol. 67, 1996, at p. 300.

[278] Article 6 of the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, done at Helsinki, March 17, 1992, entered into force 6 October 1996, 1936 U.N.T.S. 269 (1996); Article 8 of the ECE 1979 Convention on Lang-Range Transboundary Air Pollution, concluded at Geneva on Nov. 13, 1979, entered into force on 16 March 1983,1302 U.N.T.S. 217 (1983); Articles VI and VII of the 1991 US-Canada Air Quality Agreement, March 13, 1991, 1852 U.N.T.S. p. 79; Article 15 of the 1992 Convention on the Transbounndary Effects of Industrial Accidents, adopted in Helsinki on March 17, 1992, entered into force on 19 April 2000, 2105 U.N.T.S. 457, (2000); Article 5 of the Vienna Convention on the Protection of the Ozone Layer, concluded at Vienna on 22 March 1985, 1513 U.N.T.S. 293; Article 5 of the 1974 Nordic Environmental Protection Convention, (Convention on the Protection of the Environment between Denmark, Finland, Norway and Sweden) 19 February 1974, UNE EPL, Vol. 1, 1975-1976 p. 44, available at: http://www.ecolex.org/server2.php/libcat/docs/TRE/Multilateral/En/TRE000491.txt (accessed on 3.4.2012); Articles 61, 143, 200 and 244 of the 1982 United Nations Convention on the Law of the Sea, opened for signature 10 December 1982, 1833 U.N.T.S. 3; Article 13 of the 1992 Helsinki Convention on the Protection of the Marine Environment of the Baltic Area, Helsnki, 9 April 1992, entered into force on Jan. 17, 2000, 2099 U.N.T.S. 195, I-36495 (2000); Articles 9 (1) and 11 of the 1997 UN Convention on Non-Navigation Uses of International Watercourses; Article 6 (2) of the Protocol on Environmental Protection to the Antarctic Treaty, Oct. 4, 1991, S. Treaty Doc. No. 102-22 (1992); Article 13 of the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, concluded at Basel on 22 March 1989, entered into force on 5 May 1992, 1673 U.N.T.S. 57, 126, (1992); Article 24 (c) of

the 1982 UNCLOS provides for the exchange of information related to the marine environment.[279] Article 4 of the Vienna Convention for the Protection of the Ozone Layer facilitates the exchange of scientific, technical, socio-economic, commercial data, and legal information between the Contracting Parties.[280] Some conventions such as the 1994 Nuclear Safety Convention[281] obliges States Parties to provide the information related to the safety of a nuclear installation in periodic reports which have to be submitted in periodic meetings.[282] This is important because the exchange of information in specific or periodic reports is one of the most important tools to assist the Contracting Parties to monitor the implementation of environmental obligations of States at

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the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, Chiang Rai, Thailand, concluded and entered into force on Apr. 5, 1995, 2069 U.N.T.S. 3, (1999); Article 6 of the 1960 Indus Water Treaty between the Government of India, the Government of Pakistan and the International Bank for Reconstruction and Development, signed at Karachi, on 19 September 1960, entered into force on 12 January 1961, 419 U.N.T.S. 125; Article 3 (6) of the Revised Protocol on Shared Watercourses in the Southern African Development Community (SADC), Aug. 7, 2000, 40 I.L.M. 321; Article 17 of the Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79; Article 4 (1) and Annex II, the 1985 Vienna Convention for the Protection of the Ozone Layer, Mar. 22, 1985, entered into force on 22 September 1988, T.I.A.S. No. 11,097, 1513 U.N.T.S. 293, (1988); Article 9 (1) of the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, concluded at Montreal on Sept. 16, 1987, entered into force on 1 January 1989, S. Treaty Doc. No. 100-10 (1987), 1522 U.N.T.S. 3 (1989); Article 4 (1) (h), the 1992 United Nations Framework Convention on Climate Change, concluded at New York on 9 May 1992, entered into force on Mar. 21, 1994, S. Treaty Doc. No. 102-38 (1992), 1771 U.N.T.S. 107, (1994) [hereinafter UNFCCC]; Article XXIX (1), "The Helsinki Rules on the Uses of the Waters of International Rivers", adopted by the International Law Association at the fifty-second conference, held at Helsinki on 20 August 1966. Report of the Committee on the Uses of the Waters of International Rivers (London, International Law Association, 1967), available at: http://www.unece.org/env/water/meetings/legal_board/2010/annexes_groundwater_paper/Annex_II_Helsinki_Rules_ILA.pdf (accessed on 26.4.2012) Article VII of the Resolution of the Institute of International Law on "The Pollution of Rivers and Lakes and International Law", adopted in Athens on 12 September 1979, available at: http://www.idi-iil.org/idiE/resolutionsE/1979_ath_02_en.PDF (accessed on 26.5.2012).

[279] Article 200 of the 1982 United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 3.

[280] Article 4 of the Vienna Convention for the Protection of the Ozone Layer.

[281] For the Convention, see IAEA, "Convention on Nuclear Safety", IAEA Legal Series, No. 16, IAEA, Vienna, 1994; Monica J. Washington, "The Practice of Peer Review in the International Nuclear Safety Regime", in: NYULR, Vol. 72, No. 2, 1997, pp. 430-469.

[282] Article 20 of the 1994 Convention on Nuclear Safety.

a domestic level.[283] Nevertheless, the exchange of information between States is usually not an easy task, particularly with regard to nuclear activities, because such activities involve nuclear and commercial secrets which are closely guarded by industrialized countries. To facilitate the exchange of information, some instruments therefore contain provisions to induce the States to cooperate to exchange information in good faith. For example, according to the ILC Draft Articles on Prevention of Transboundary Harm:

> 'Data and information vital to the national security of the State of origin or to the protection of industrial secrets or concerning intellectual property may be withheld, but the State of origin shall cooperate in good faith with the State likely to be affected in providing as much information as possible under the circumstances'.[284]

Accordingly, this Article limits the scope of the obligation of the State to provide information where such information is related to the national security of the Origin State or to the protection of the industrial secret or the intellectual property.[285] However, this is in conflict with the obligation of the State for the protection of the environment from damage caused by hazardous activities which requires providing all the available information by the Origin State regarding the activity in question. The drafters of the Articles were aware of that and therefore in the same Article require the Origin State to cooperate with the affected State as good faith as possible according to its circumstances, in order to make balance between the interests of these States. This exception is justified by the fact that such information is vital to the national security and an important issue for the State. Nevertheless, there is no definition of vital information for the national security. Accordingly, this will subject to the determination of the Origin State according to the specific circumstances. However, this gives the Origin State the chance in case of breach of the principle of providing information to plea that the undisclosed prevented information is vital for the national security. Also, the industrial secret and the intellectual property are protected by national law[286] which protects rights of individuals more than States. This exception is pro-

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[283] Hunter, Sommer and Vaughan, GELA, Vol. III, 1995, at p. 113.

[284] Article 14 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm; also see Articles 20 and 21 of the 2000 Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal on 29 January 2000, entered into force on 11 September 2003, 2226 U.N.T.S. 208, (20030; Article 9 (5) of the 2001 Stockholm Convention on Persistent Organic Pollutants, adopted in Stockholm on 22 May 2001 and entered into force 17 May 2004, 2256 U.N.T.S. 119, (2004).

[285] YILC, 2001, Vol. II, Part Two, at p. 167, para (1).

[286] YILC, 2001, Vol. II, Part Two, at p. 167, para (1).

vided for under other conventions such as 1997 Convention on Watercourse in relation to information to the national defense or security.[287]

However, there is no uniform principle or customary rule for exchange of information. Rather, it is based on a relevant agreement which has its own terms and conditions.[288] The principle is also part of the general duty of co-operation and is useful to determine whether a State has breached the obligation to prevent transboundary harm.[289]

The obligation to prevent transboundary harm is different from the obligation of a State to provide early notification in case of a nuclear accident or in an emergency situation, as discussed below. The latter is related to providing relevant information about the accident, so as to take preventive measures to avoid and to reduce its harmful consequences.[290] The former, however, relates to providing information on the basis of cooperation between States during the construction and operation of a nuclear activity to control the potentially harmful consequences.[291] It is aimed at the exchange of necessary information about the activity between States to allow them to take the necessary measures to avoid the harmful consequences of a potential nuclear accident.[292] This is indicated by the tribunal in the MOX Plant Case which ordered Ireland and UK to cooperate and exchange information regarding the commissioning of the plant, monitor risks and take the relevant measures to prevent potential environmental damage.[293]

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[287] Article 31 of the 1997 Watercourses Convention. Also, Article 2 (8) of the 1991 of Espoo Convention states that '[t]he provisions of this Convention shall not affect the right of Parties to implement national laws, regulations, administrative provisions or accepted legal practices protecting information the supply of which would be prejudicial to industrial and commercial secrecy or national security'.

[288] Owen McIntyre, "Environmental Protection of International Watercourses under International Law", Ashgate Publishing Company, USA, UK, 2007, at p. 336.

[289] McIntyre, 2007, at p. 336.

[290] Daniel G. Partan, "The 'Duty to Inform' in International Environmental Law", in: BUILJ, Vol. 6, 1988, pp. 43-88, at p. 44.

[291] Van Dyke, DJILP, Vol. 35, No. 1, at pp. 20-21.

[292] Van Dyke, DJILP, Vol. 35, No. 1, at p. 22.

[293] The Tribunal ordered the two countries to take 'the following provisional measure under article 290, paragraph 5, of the Convention [UNCOLS]:
Ireland and the United Kingdom shall cooperate and shall, for this purpose, enter into consultations forthwith in order to:
(a) exchange further information with regard to possible consequences for the Irish Sea arising out of the commissioning of the MOX plant;
(b) monitor risks or the effects of the operation of the MOX plant for the Irish Sea;
(c) devise, as appropriate, measures to prevent pollution of the marine environment which might result from the operation of the MOX plant'. Para. 89 (1), the 3 December

5.2.2.5 Providing information to the public

In international law the public has the right to acquire information regarding high-risk activities.[294] This increases public awareness and encourages people to take action in the most important matters, such as the disposal of nuclear waste.[295] It also enables the public to participate in making decisions, observe the compliance of the State in implementing the environmental obligations and take action against the use of nuclear reactors if they are unsafe.[296]

2001 Order. The Order is available at: http://www.itlos.org/start2_en.html (accessed on 21.10.2010).

[294] See in general, Jonas Ebbesson, Draft Paper: "Participatory and Procedural Rights in Environmental Matters: State of Play", Stockholm University, High Level Expert Meeting on the New Future of Human Rights and Environment: Moving the Agenda Forward, co-organized by UNEP and OHCHR, Nairobi, Kenya, 30 November – 1 December 2009, available at: http://www.unep.org/environmentalgovernance/LinkClick.aspx?fileticket=vZU4Z-_S4Vo%3D&tabid=2046&language=en-US (accessed on 22.2.2012); Libor Jansky and Juha I. Uitto (eds.) "Enhancing Participation and Governance in Water Resources Management: Conventional Approaches and Information Technology", United Nations University Press, Tokyo, New York, Paris, 2005.

[295] Sands, 2003, at p. 826; OECD/NEA, "Information Policies of Nuclear Regulatory Organizations", Paris (France) Seminar 6-8 December 1993, OECD Paris 1994; O'Connor, M., "Prospects for Public Participation on Nuclear Risks and Policy Options: Innovations in Governance Practices for Sustainable Development in the European Union", in: JHM, Vol. 86, No. 1-3, 2001, pp. 77-99, at p. 82.

[296] As a result of the pressure of public opinion after the Chernobyl accident, nuclear programs in several countries were interrupted. For instance, the development of the nuclear program of the former USSR was stopped. (O'Connor, M. "Prospects for Public Participation on Nuclear Risks and Policy Options: Innovations in Governance Practices for Sustainable Development in the European Union", in: JHM, Vol. 86, No. 1-3, 2001, pp. 77-99, at p. 82) Dusko Doder and Louise Branson, "Gorbachev: Heretic in Kremlin", Futura Publications, London, United States, 1990, pp. 129-141, at p. 134-135) The authorities closed two nuclear power plants in Armenia and cancelled other plants that were under construction; the United States deferred the construction of more than one hundred nuclear power plants; the Netherlands cancelled the construction of two new nuclear power plants; and other countries such as Austria, Denmark and Ireland also cancelled the construction of nuclear power plants. Washington, NYULR, Vol. 72, No. 2, 1997, at p. 439.) Moreover, the Government of Egypt concluded several bilateral agreements in the early 1980s with other States, such as the United States (United States of America and Egypt: Agreement for Cooperation Concerning Peaceful Uses of Nuclear Energy, (with annex and agreed minute), Signed at Washington on 29 June 1981, UNTS, Vol. 1529, No. I-26518, (1989), p. 144) , France (France and Egypt: Agreement on Co-operation in the Peaceful Uses of Nuclear Energy (Accord de coopération relatif aux utilisations pacifiques de l'énergie nucléaire), signed at Paris on 27 March 1981, 1298 U.N.T.S. 89), and Canada, (Agreement for Co-operation in the Peaceful Uses of Nuclear

In general, public participation in environmental issues is increasing.[297] At the moment, media and communications technology facilitate the discourse between States, as well as among the public and increase interaction regarding environmental issues.[298] As mentioned in conferences, for example, the public is playing a vital role in urging governments to change their political agenda in favour of the environment.[299] Therefore it is not surpris-

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Energy, Can.-Egypt, signed at Ottawa on 17 May 1982 and came into force on 8 November 1982, 1470 U.N.T.S. 319 (1987), 21 ILM 710 (1982)), These agreements were aimed at cooperation on the peaceful uses of nuclear energy, supply of nuclear substances and equipment for the construction of new nuclear power plants. However, after the Chernobyl accident Egypt suspended its nuclear program. One of the reasons for suspending the program was due to the domestic opposition and pressure for the safety of the public and the environment. See Barbara M. Gregory, "Egypt's Nuclear Program: Assessing Supplier-Based and Other Developmental Constraints", The Non-proliferation Review/Fall 1995, pp. 20-27, at p. 25, available at: http://cns.miis.edu/npr/pdfs/gregor31.pdf (accessed on 28.2.2012). Finally, after the 2011 Fukushima nuclear accident, as a result of the public pressure, the German Government announced that it was decommissioning all nuclear reactors in Germany by 2030. Last year it amended its Atomic Energy Act to specify a shorter economic life of nine newer nuclear power plants and the rapid shutdown of eight older plants. Michael Sailer (ed.), "Fukushima-A Year After the Disaster", in eco@Work-April 2012, published by Oeko Institute e.V., available at: http://www.oeko.de/e-paper-eng/dok/470.php?id=26&haupt=2 (accessed on 1.5.2012).

[297] Hunter, Salzman and Zaelke (eds.), 2007, at p. 438.

[298] Boustany, CYIL, Vol. 27, 1989, pp. 497-501, at p. 501.

[299] See in general, Thomas Dietz and Paul C. Stern (eds.), "Public Participation in Environmental Assessment and Decision Making", Panel on Public Participation in Environmental Assessment and Decision Making, Committee on the Human Dimensions of Global Change, Division of Behavioural and Social Sciences and Education, National Research Council of the National Academies, The National Academies Press, Washington, D. C. 2008, available at: http://www.nap.edu/openbook.php?record_id=12434 (accessed on 24.2.2012). Reference should be made to the role of the NGOs in guiding and directing the governmental policies in taking action, drawing up policies and implementing the national and international standards established for the protection of people and the environment from the adverse affects of the use of nuclear energy. Several NGOs have been established worldwide for the purposes of environmental protection. These organizations play a significant role in the establishment and enforcement of the global environmental priorities. Protection of the global environment is in fact the most difficult problem facing the international community. This is due to the fact that most of the environmental problems arise from political issues and States address them in the context of their own self-interest. Reference should be made to three non-governmental organizations, the British/European Insurance Committee, Greenpeace International and UNIPEDE which were represented by observers during the negotiations on the revision of the Vienna Convention and the Convention on Supplementary Compensation which were adopted in 1997. IAEA, "Measures to Strengthen International Cooperation in Nu-

ing to find that public views have been taken into account in international instruments.[300]

Although the 1992 Rio Declaration was not the first instrument to grant the public the right to obtain information and participate in decision making regarding hazardous activities, it incorporated a customary international principle which is embodied in other international instruments.[301] According to the 2001 ILC Draft Articles on Prevention of Transboundary Harm, 'States concerned shall, by such means as are appropriate, provide the public likely to be affected by an activity within the scope of the present articles with relevant information relating to that activity, the risk involved and the harm which might result and ascertain their views'.[302] The duty to provide information to the public has been reflected in State practice and introduced in many environmental instruments.[303] According to Article 6 (1) of the 1998

clear, Radiation and Waste Safety", at p. 1, IAEA Doc. GC(40)/INF/9 (Sept. 13, 1996), available at: http://www.iaea.org/About/Policy/GC/GC40/GC40InfDocuments/English/gc40inf-5_en.pdf (accessed on 24.4.2012); (SCNL/14/INF.5: 1). These organizations presented important proposals which had significant outcome in the development of the draft articles of the negotiating conventions, the 1997 Protocol to amend to the 1963 Vienna Convention on Civil Liability for Nuclear damage and the 1997 Vienna Convention on Supplementary Compensation for nuclear Damage. As a result of these proposals environmental damage was covered by the Conventions.

[300] Many environmental conventions currently in effect provide for the right of the public to acquire the necessary information about the presumed hazardous activity and to participate in making decisions relating to such activities. Henri Smets, "The Right to Information on the Risks Created by Hazardous Installations at the National and International level", in: Francesco Francioni and Tullio Scovazzi (eds.), International Responsibility For Environmental Harm, International Environmental Law Policy Series, Graham & Trotman/Martinus Nijhoff, London, 1991, pp. 449-492, at p. 452.

[301] Principle 10 of the 1992 Rio Declaration provides that '[e]nvironmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided'.

[302] Article 13 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.

[303] Article 3 (8) of the 1991 Ecpoo Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention), available at: http://www.unece.org/env/eia/about/eia_text.htm#article3 (accessed on 22.10.2010); Article 16 of the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, available at: http://www.unece.org/env/water/pdf/watercon.pdf (accessed on 3.4.2012); Article 17 of

Aarhus Convention, for example, every State party must allow the public to participate in making decisions in relation to the nuclear activities listed in Annex I when deciding to permit such activities.[304] This Convention links the protection of the environment and human rights by focusing on the democratic interaction between the public and the governments and the accountability of

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the 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area, available at: http://www.helcom.fi/stc/files/Convention/Conv0704.pdf (accessed on 11.1.2011); Article 14 (1) of the Convention on Biological Diversity; Articles 6 and 12 (10) of the 1992 United Nations Framework Convention on Climate Change, available at: http://unfccc.int/resource/docs/convkp/conveng.pdf (accessed on 22.10.2010); Article 9 and Annex VIII of the 1992 Convention on the Transboundary Effects of Industrial Accidents, available at: http://www.unece.org/env/documents/2006/teia/Convention%20E%20no%20annex%20I.pdf (accessed on 22.10.2010); Article 9 of the 992 Convention for the Protection of the Marine Environment of the North-East Atlantic, signed in Paris on 22 September 1992, entered into force on 25 March 1998, 2354 U.N.T.S. 67, (2006), as amended on 24 July 1998, updated 9 May 2002, 7 February 2005 and 18 May 2006, available at: http://www.ospar.org/html_documents/ospar/html/OSPAR_Convention_e_updated_text_2007.pdf (accessed on 11.4.2012), L.104/2, Official Journal of the European Communities, 3.4.98, also available at: http://ec.europa.eu/world/agreements/downloadFile.do?fullText=yes&treatyTransId=1373 (last visited 11.1.2011); Regulation (EC) No. 1049/2001 of the European Parliament and the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents, Official Journal of the European Communities L 145/43, 31.5.2001, available at: http://www.europarl.europa.eu/RegData/PDF/r1049_en.pdf (accessed on 26.4.2012); Directive 2003/4/EC of European Parliament and the Council of 28 January 2003 on public access to environmental information and replacing Council Directive 90/313/EEC, Official Journal of the European Union L 41, 26, 14.2.2003, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:041:0026:0032:EN:PDF (accessed on 26.4.2012).

[304] These activities include, '[n]uclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors 1/ (except research installations for the production and conversion of fissionable and fertile materials whose maximum power does not exceed 1 kW continuous thermal load); Installations for the reprocessing of irradiated nuclear fuel; Installations designed: For the production or enrichment of nuclear fuel; For the processing of irradiated nuclear fuel or high-level radioactive waste; For the final disposal of irradiated nuclear fuel; Solely for the final disposal of radioactive waste; Solely for the storage (planned for more than 10 years) of irradiated nuclear fuels or radioactive waste in a different site than the production site'. Annex I of the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, concluded in Aarhus, Denmark, on 25 June 1998. The text of the Convention is available at: http://www.unece.org/env/pp/documents/cep43e.pdf (accessed on 18.8.2009).

the governments.[305] This is particularly important with regard to a nuclear accident which may have a serious impact on the public. In 1985, the IAEA Group of Experts recommended that providing information to the public in case of a nuclear accident is the responsibility of the competent authorities in each State.[306] However, the 1986 Early Notification and Assistance Conventions, as discussed below, were adopted without any provisions regarding providing information to the public and their right to acquire such information in case of a nuclear accident. The 1986 Assistance Convention only provides that '[t]he assisting party shall make every effort to coordinate with the requesting State before releasing information to the public on the assistance provided in connection with a nuclear accident or radiological emergency'.[307] At the same time, the right of the public to acquire information is one of the basic rights in international law.[308] In case of a nuclear activity, it helps the public to protect themselves from the harmful consequences of a nuclear accident and also helps the States to overcome the consequences of the accident. According to the nuclear liability conventions, preventive measures can be taken by the State or by any person after the occurrence of a nuclear accident to prevent or reduce its harmful consequences.[309] As a result of the failure of the

[305] Hunter, Salzman and Zaelke (eds.), 2007, at p. 438.

[306] IAEA "Guidelines on Reportable Events, Integrated Planning and Information Exchange in a Transboundary Release of Radioactive Materials", INFCIRC/321, IAEA, Vienna 1985, at p. 6, available also at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc321.pdf (accessed on 25.2.2012).

[307] Article 2 (2) of the 1986 Convention on Early Notification of a Nuclear Accident, IAEA Doc. INFCIRC/335 (Sept. 26, 1986) [hereinafter Convention on Early Notification 1986].

[308] Articles 10 and 19 of the 1948 Universal Declaration of Human Rights (UDHR), G.A. Res. 217 (III) A, U.N. Doc. A/RES/217(III), available at: http://www.un.org/en/documents/udhr/index.shtml (accessed on 22.10.2010); Articles 14 and 25 of the 1966 International Covenant on Civil and Political Rights (ICCPR), adopted by the General Assembly Resolution 2200A (XXI) on 16 December 1966, entered into force on 23 March 1976, available at: http://www2.ohchr.org/english/law/ccpr.htm#art25 (accessed on 22.10.2010); and Article 13 of the 1981 African [Banjul] Charter on Human and People's Rights, adopted June 27, 1981, OAU Doc. CAB/LEG/67/3 rev. 5, 21 I.L.M. 58 (1982), entered into force Oct. 21, 1986 available at: http://www1.umn.edu/humanrts/instree/z1afchar.htm (accessed on 11.4.2012).

[309] Article I (1) (n) of the 1997 Amended Vienna Convention on Civil Liability for Nuclear Damage; Article 1 (a) (ix) of the 2004 Amended Paris Convention on Third Party Liability in the Field of Nuclear Energy. Also see Article 2 (9) of the 1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, opened for signature on 21 June 1993, 150 CETS21.VI.1993.

USSR to inform the public, the harmful consequences as a result of the accident severely affected the public and the environment of the USSR and other States as well. If the USSR had provided early information about the accident, the public could have contributed to preventing or reducing its harmful consequences by taking preventive measures such as evacuating people from the affected areas.

5.3 Post-accident obligations: Notification and assistance in event of a nuclear accident

Early notification and assistance in the event of a nuclear accident have been emphasized since the early use of nuclear energy and now constitute principles in international law.[310] These two principles impose certain obligations upon the Source State to notify, inform, and cooperate with other States and the international organizations concerned in the event of a nuclear accident or emergency situation. The information provided after a nuclear accident is important for the prevention and reduction of damage caused by the accident. These two principles enable the affected States and other States which are likely to be affected by a nuclear accident to take preventive measures to prevent and reduce the harmful consequences of the accident.[311] In practice, these principles are included in a number of international treaties and agreements between States in various areas of international law, particularly in the law of the sea,[312] space law, environmental law,[313] European law[314] and nuclear

[310] Weiss (ed.), 1992.

[311] Okowa, 2000, p. 145.

[312] See, Articles 198 and 211 (7) of the 1982 UNCOLS; Articles 14 and 25 of the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, G.A. Res. 51/229, U.N. Doc. A/RES/51/229 (July 8, 1997).

[313] Montreal Conference Resolutions on "Legal Aspects of the Conservation of the Environment", International Law Association, Report of the 60th Conference, August 29-September 4 1982, Canada 1983; Article 7 of the "ILA Montreal Rules on Water Pollution in An International Drainage Basin", in: Munro and Lammers, 1987, pp. 189-191; Convention on the Protection of the Marine Environment of the Baltic Sea, Annex VI, Helsinki 22 March 1974, came into force on 3 May 1980, 13 ILM 544 (1974), 1507 U.N.T.S. 168, (1988); Article 9 of the Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution, Barcelona 16 February 1976, 15 ILM 290 (1976), 1102 U.N.T.S. 27, (1978); Article II of the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, concluded at Cartagena de Indias, Colombia, on Mar. 24, 1983, Mar. 24, 1983, 1506 U.N.T.S. 157, (1988) and other treaties in the UNEP Regional Seas series. Also see Article 13 of the Basil Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal, adopted at Basel on 22 March 1989, entered into force on 5 May 1992, 28 ILM 649 (1989), available at: www.basel.int (accessed on 4.4.2012).

law. They are reflected in customary international law and are widely accepted as general principles of customary international law.[315]

The USSR's delay in announcing the Chernobyl accident drew the attention of the international community to the need for an obligation of the State to notify and warn the neighbouring States and other States in the event of a nuclear accident.[316] As a result of the USSR's failure to provide immediate notification about the Chernobyl accident, the two principles of early notification and assistance were codified in the 1986 Convention on Early Notification of a Nuclear Accident and the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, which were adopted under the auspices of the IAEA.[317] These two conventions were adopted because the practical application of the international customary norms regarding the issues of notification was not clear.[318] The international community realized there was a need to strengthen and improve the legal regime of international law regarding nuclear energy to control transboundary environmental damage and to prevent and reduce consequences of nuclear accidents.[319] After codification, these

[314] Council Decision of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency. (87/600/Euratom). OJ, L-371 of 30/12/87, at p. 76, available at: http://ec.europa.eu/energy/nuclear/radioprotection/doc/legislation/87600_en.pdf (accessed on 26.4.2012).

[315] Lyster and Bradbrook, 2006, at p. 39.

[316] Immediately after the Chernobyl accident the IAEA held an international conference to review the legal regime of nuclear energy in order to create a system aimed at the prevention and mitigation of the effects of nuclear accidents and the enforcement of the existing regime of liability for nuclear damage.

[317] The two Conventions were adopted at the IAEA Headquarters in Vienna on 26 of September 1986. IAEA, Legal Series, No. 14, Vienna, 1987; ILM, Vol. 25, 1986, p. 1377. The two Conventions came into force on 27 October 1986 and 26 February 1987 respectively. The text of the Nuclear Accident Convention is published also in IAEA Doc. INFCIRC/335, 18 November 1986, also available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc335.shtml (accessed on 2.6.2010); the 1986 Convention on Assistance, IAEA Doc. INFCIRC/336, 18 November 1986, also available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc336.shtml (accessed on 2.6.2010).

[318] Kiss and Shelton, 2004, at pp. 84-88; D'Amato and Engel (eds.), 1996), 1996, at p. 12; Redgwell, 2007, at p. 76.

[319] A. O. Adede, "The IAEA Notification and Assistance Conventions in Case of a Nuclear Accident: Landmarks in the Multilateral Treaty-Making Process", Graham & Trotman/Martinus Nijhoff Publishers, London/Dordrecht/Boston, 1987; Berthold Moser, "The IAEA Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency", in: NLB, No. 44, 1989,

obligations of notification and assistance in the case of a nuclear accident became clearer as regards their application, as a result of the detailed content of these codified conventions.[320]

This Section discusses certain aspects of the basis of the obligation of a State to provide early notification and assistance in the case of a nuclear accident, i.e., post-accident obligations. Section 5.3.1 will examine the principle of notification and assistance in general rules of international law, while Section 5.3.2 will examine the 1986 Notification Convention, and Section 5.3.3 will examine the 1986 Assistance Convention.

5.3.1 The principles of notification and assistance in general rules of international law

In its judgment in the 1949 in Corfu Channel case, the ICJ set out a general principle for the early notification of a catastrophe caused by hazardous activities.[321] In its decision, the court stated that:

> 'The obligations incumbent upon the Albanian authorities consisted in notifying, for the benefit of shipping in general, the existence of a minefield in Albanian territorial waters and in warning the approaching British warships of the imminent danger to which the minefield exposed them. Such obligations are based... on certain general and well-recognised principles, namely ... every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States'.[322]

This judgment held Albania accountable for its failure to notify Britain before, rather than after, the accident, but most importantly, it set up a precedent which is considered a principle in international law: A State is obliged to notify other States when conducting hazardous activity in general and to provide the necessary information to prevent environmental damage caused by such activity. The principle received wide support after its recognition in the 1972 Stockholm Declaration. According to Principle 20 of this Declara-

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pp. 10-23; Sharon McBrayer, "Chernobyl's Legal Fallout-The Convention on Early Notification of a Nuclear Accident", in: GJICL, Vol. 17, No. 2, 1987, 303-319; IAEA, Legal Series No. 14, 1987; Peter Cameron, "The Vienna Convention on Early Notification and Assistance", in: Cameron, Hancher and Kühn (eds.), 1988, pp. 19-32; IAEA, "Emergency Planning and Preparedness", in: IAEA, Nuclear Safety Review, 1992, pp. 97-98, at p. 97; Pelzer, ADV, Vol. 25, 1987, at p. 303; Peter P. C. Haanappel , "Some Observations on the Crash of Cosmos 954", in: JSL, Vol. 6, 1978, 147-149.

[320] IAEA Doc., GC(SPL. I)OR.4, Mar. 1987, p. 8.); Sands, RECIEL, Vol. 5. Issue 3, 1996, at p. 200; Boyle, BYIL, Vol. 60, 1989, at p. 281.

[321] ICJ Reports, 1949, at p. 4.

[322] ICJ Reports, 1949, at p. 22.

tion, the relevant information must be provided by the State in whose territory, jurisdiction, or control a hazardous activity is carried out.[323] Such information is needed to avoid the risk of significant adverse effects on the environment beyond a State's national territory.[324] This was also affirmed in Principle 18 of the 1992 Rio Declaration, which states that 'States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted'.[325]

The 2001 ILC Draft Articles on Prevention of Transboundary Harm contain two articles specifically relating to the emergency situations: Article 16 on "emergency preparedness" and Article 17 on "notification of an emergency".[326] The obligation of notification is also reflected in international practice. For example, Article 198 of the 1982 United Nations Convention on the Law of the Sea provides that '[w]hen a State becomes aware of cases in which the marine environment is in imminent danger of being damaged or has been damaged by pollution, it shall immediately notify other States it deems likely to be affected by such damage, as well as the competent international organizations'.[327] The duty to notify was also adopted by the Convention on Environmental Impact Assessment in a Transboundary Context[328] and by the Convention on the Transboundary Effects of Industrial Accidents.[329] In addition, a number of decisions and recommendations were adopted by international organizations.[330] Moreover, in 1992 the UN Gen-

[323] Principle 20 of the 1972 Stockholm Declaration.

[324] Partan, BUILJ, Vol. 6, 1988, at p. 44; see in general, Smets, 1991, pp. 449-472.

[325] Principle 18 of the 1992 Rio Declaration.

[326] Article 16 provides that '[t]he State of origin shall develop contingency plans for responding to emergencies, in cooperation, where appropriate, with the State likely to be affected and competent international organizations'. In addition, Article 17 States that '[t]he State of origin shall, without delay and by the most expeditious means at its disposal, notify the State likely to be affected of an emergency concerning an activity within the scope of the present articles and provide it with all relevant and available information'.

[327] Article 198 of the 1982 UNCLOS.

[328] ILM, Vol. 30, 1991, p. 800.

[329] For the text of the Convention see, ILM, Vol. 31, 1992, at p. 1333, available also at: http://sedac.ciesin.columbia.edu/entri/texts/industrial.accidents.1992.html (accessed on 24.2.2010).

[330] The 1984 IAEA "Guidelines for Mutual Emergency Assistance Arrangements in Connection with a Nuclear Accident or Radiological Emergency". INFCIRC/310, IAEA Vienna 1984. These Guidelines are also available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc310.pdf (accessed on

eral Assembly adopted principles relevant to the utilization of nuclear energy in outer space and its use in operating space objects and satellites.[331] The United Nations Committee on the Peaceful Uses of Outer Space examined these principles and adopted measures and principles concerning the prevention, mitigation and redress of damage caused by the use of nuclear power sources in outer space.[332] According to these principles, the State launching a space object using nuclear power sources has to notify any States concerned and provide them with relevant information related to the launched object.[333]

25.3.2010); Mohamed M. ElBaradei, E. I. Nwogugu and John M. Rames, "The International Law of Nuclear Energy: Basic Documents", Martinus Nijhoff, Dordrecht, 1993; the 1985 IAEA "Guidelines on Reportable Events, Integrated Planning and Information Exchange a Transboundary Release of Radioactive Materials", INFCIRC/321, IAEA, Vienna 1985. These Guidelines are also available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc321.pdf (accessed on 25.3.2010); Mohamed ElBaradei, Nwogugu and Rames, 1993, p. 1261; the Council of the European Communities. "Council Decision of 14 December 1987 on Community Arrangements for the Early Exchange of Information in the Event of a Radiological Emergency 87/600/EURATOM", OJ.L-371 of 371/11/87, p. 78; the Council of the European Communities, "Council Directive of 27 November 1989 on Information the General Public About Health Protection Measures to be Applied and Steps to be Taken in the Event of a Radiological Emergency 89/618/EURATOM", OJ.L-357 of 07/12/89, p. 31. ElBaradei, Nwogugu and Rames, p. 1291; "Commission Communication on the Implementation of Council Directive 89/618/ERATOM of 27 November 1989 on Informing the General Public About Health Protection Measures to be Applied and Steps to be Taken in the Event of a Radiological Emergency 91/C 102/03", OJ.C-103 of 19/04/91, p. 12.

[331] See, the UNGA Resolution No. 47/68 on Principles Relevant to the Use of Nuclear Power Sources in Outer Space, adopted by the UNGA at its 85th plenary meeting, 14 Decemebr 1992.

[332] These principles were adopted by UN Resolution 47/68 of 14 December 1992. For the Resolution see G.A. Res. 47/68, U.N. Doc. A/RES/47/68, available at: http://www.un.org/Depts/dhl/resguide/r47.htm (accessed on 10.4.2012). For references to the use of nuclear power sources in outer space, see Marietta Benkö, Gerbard Gruber and Kai-Uwe Scbrogl, "The UN Committee on the Peaceful Uses of Outer Space: Adoption of Principles Relevant to the Use of Nuclear Power Sources in Outer Space and Other Recent Development", in: ZFLW (GJASL), 42 Jahrgang 1993, pp. 35-64, Annex I, at p. 55; Carl Q. Christol, "The Use of a Nuclear Power Source (NPS) in Outer Space", in: Zeitschrift Für Luft-und Weltraumrecht (German Journal of Air and Space Law, Vol. 30, 1981, pp. 47-79; Vladimir Kopal, "The Use of Nuclear Power Sources in Outer Space: A New Set of United Nations Principles?" in: JSL, Vol. 19, No. 1 & 2, 1991, pp. 103-123; Andrea Bianchi, "Environmental Harm Resulting from the Use of Nuclear Power Sources in Outer Space: Some Remarks on State Responsibility and Liability", in: Francioni and Scovazzi (eds.), 1991, pp. 231-272.

[333] See Principle 5 of the 1992 Outer Space Principles. G.A. Res. 47/68, 5, U.N. Doc. A/RES/47/68 (Feb. 23, 1993).

It also has to offer assistance to the affected State to reduce and eliminate damage caused by such nuclear power sources.[334] The Launching State is responsible for preventing such damage and for compensating the injured State for damage caused by a space object carrying nuclear power sources.[335]

Therefore the Source State must develop emergency plans to respond to emergency situations.[336] It is also obliged to inform the affected States and international organizations concerned and cooperate to provide them with all relevant and available information concerning the prevention and reduction of risks which may arise from industrial activities located within the source State's territory, jurisdiction, or control.[337] The required information must include all the necessary data and information that will enable the affected State to evaluate the situation. Such information may also include characteristics of the activity, the created risk, and the type of the injury caused, amongst other things.[338]

5.3.2 The 1986 Notification Convention

The Early Notification Convention[339] requires the State in whose territory, jurisdiction, or control a nuclear accident has occurred to quickly notify

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[334] See Principle 5 of the 1992 Outer Space Principles.

[335] See Principles 6-9 of the 1992 Outer Space Principles. For references on State responsibility for damage caused by space objects, see; Bin Cheng, "International Responsibility and Liability Launch Activities", in: ASL, Vol. XX, No. 6, 1995, pp. 297-310; Andre G. DeBusschere, "Liability for Damage Caused by Space Objects", in: JILP, Vol. 3, No. 1, 1994, pp. 97-107; Krystyna Wiewiorowska, "Some Problems of State Responsibility in Space Law", in: JSL, Vol. 7, No. 1, 1979, pp. 23-39; Jochen Pfeifer, "International Liability for Damage Caused by Space Objects", in: ZFLW (GJASL), Vol. 30, 1981, pp. 215-257; Paul G. Dembling, "A Liability Convention: Next Step in the Legal Regime for Outer Space Activities", in: Edward McWhinney and Martin A. Bradley (eds.), New Frontiers in Space Law, A. W. Sijthoff/Leyden, Oceana Publications Inc./Dobbs Ferry. N. Y., 1969, pp. 89-102; Hurwitz, 1992.

[336] Partan, BUILJ, Vol. 6, 1988, at p. 80.

[337] V. S. Vereschetin, "Legal Status of International Legal Space Crews", in: Nicolas Mateesco Matte (ed.), Annals of Air and Space Law, Vol. III, 1978, The Carswell Company Limited, Toronto-Paris, 1978, pp. 545-560, at pp. 553-559.

[338] Partan, BUILJ, Vol. 6, 1988, at p. 80.

[339] Convention on Early Notification 1986, I.L.M, Vol. XXV, No. 6, 1986, p. 1370; INFCIRC/335 18 November 1986; http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc335.shtml (accessed on 13.9.2009). Similar provisions are also embodied in a number of bilateral and regional instruments in respect of early notification and providing information in case of nuclear accident. See, e.g., Exchange of Notes Between the Government of the United

States likely to be affected by the accident, as well as the IAEA, and to provide the relevant information about the accident.[340] This constitutes the duty to notify and the duty to inform. The two duties have different meanings, as the duty to notify is related to the announcement of the accident, while the duty to inform is related to providing the relevant information about the accident.[341]

The scope of notification includes nuclear accidents caused by nuclear reactors; nuclear fuel cycle facilities; radioactive waste management facilities; the transport and storage of nuclear fuels or radioactive wastes; the manufacture, use, storage, disposal and transport of radioisotopes for agricultural, industrial, medical and related scientific and research purposes; and the use of radioisotopes for power generation in space objects.[342]

Kingdom and Northern Ireland and the Government of the French Republic Concerning Exchanges of Information in the event of Emergencies Occurring in One of the Two States which Could Have Radiological Consequences for the Other State, London, 18 July 1983, entered into force on 18 July 1983, UK Treaty Series, No. 60, 1983; Agreement between the Government of France Republic and the Swiss Federal Council on Exchanges of Information in the Event of Accidents Involving Radiological Risks, Paris, October 18, 1979. UNTS, Vol. 1183, No. I-18951, p. 210, available at: http://treaties.un.org/doc/Publication/UNTS/Volume%201183/volume-1183-I-18951-English.pdf (accessed on 12.4.2012); Agreement between France-FRG on Mutual Information in the Event of Radiological Incidents, Bonn, 28 August 1981, [text in Germany] Bundesgesetzblatt, Jahrgang, Teil (Vol. II), 1981, pp. 885-886; Agreement between France and Luxembourg on Exchange of Information in the Case of Radiological Emergencies, 1983, signed on 11th April 1983, entered into force on 27th April 1984, NLB, No. 34, 1984, p. 42; Norway-Sweden Agreement on Exchange of Information and Early Notification Relating to Nuclear emergence, 21st October 1986, in: NLB, No. 39, 1987, p. 35 and in: EPL, Vol. 17, 1987, p. 41; Agreement Between the Government of the Republic Finland and the Government of the Union Soviet Socialist Republics on Early Notification on a Nuclear Accident and Exchange of Information on Nuclear Facilities, 7th January 1987, in: NLB, No. 39, 1987, p. 54; Brazil-Argentina: 1987 Agreement Between Brazil and Argentina on Early Notification and Mutual Assistance in Case of Nuclear Accidents or Radiological Emergencies, 1987, in: NLB, No. 39, 1987, p. 36; the Governments of Denmark, Finland, Norway and Sweden, Nordic Agreements on the Exchange of Information and Early Notification in Case of Nuclear Emergencies, (1986-1987), in: NLB, No. 39, 1987, p. 35; Agreement between the Swiss Federal Council and the Government of the Federal Republic of Germany on Radiation Protection in Case of Emergency, Done at Bonn on 31 May 1978, NLB, No. 22, 1978, pp. 51-52.

[340] Article 2 of the 1986 Early Notification Convention.

[341] Moser, NLB, No. 44, 1989, at p. 11, reprinted in OECD/NEA, 2006, pp. 119-128, at p. 120.

[342] According to Article 1 (2) of the 1986 Convention On Early Notification of a Nuclear Accident, 1439 U.N.T.S. 276.

The information that is supplied should be relevant to the accident, and should help to reduce and minimize the harmful consequences of the accident. The information is supplied directly to the States likely to be affected by the accident or via the IAEA.[343] The information must also be provided to all States likely to be affected by the accident, including Non-Contracting States to the Convention.[344] The information provided should include the time, exact location and nature of the accident; the facility or activity concerned; the cause of the accident; and the general characteristics of the radioactive release among other relevant information.[345] In addition, each State Party should inform the IAEA and other States Parties of its responsible authorities and points of contact responsible for issuing and receiving the notification and information.[346] Furthermore, the IAEA should investigate the feasibility and establishment of an appropriate monitoring system to achieve and facilitate the aims of the Convention.[347]

The Early Notification Convention and the Assistance Convention were applied for the first time in the Goiânia accident which took place in Brazil in October 1987[348] and in the Japanese Tokaimura nuclear accident in 1999.[349] During these two accidents, the Accident State notified the IAEA of the accident and requested assistance from it.[350] Finally, they were applied in the 2011 Fukushima nuclear accident.[351]

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[343] Article 2 of the 1986 Notification Convention.

[344] Cameron, 1988, at p. 25.

[345] Article 5 of the 1986 Convention on Early Notification of a Nuclear Accident, 1439 U.N.T.S., at p. 277. For notification for military facility see, Adede, 1987, pp. 37-38.

[346] Article 7 of the 1986 Convention on Early Notification of a Nuclear Accident, 1439 U.N.T.S., at p. 278.

[347] Article 8 of the 1986 Notification Convention.

[348] Cameron, 1988, at p. 29; Sands, 1988, footnote, at p. 40. On September 13, 1987, a radiological accident occurred in the city of Goiânia, Brazil. The accident was one of the most serious radiological accidents to occur after the adoption of the Early Notification Convention and the Assistance Convention. At the end of 1985, a private institute for radiotherapy moved out of their clinic building, leaving behind a machine that was a source of radioactivity (137 Tele-Therapy United) without notifying the competent authorities. Two people entered the building and, thinking that the machine was valuable and not knowing it was radioactive, took it one of their homes. They then broke the machine into parts and spread it to surrounding areas, causing four deaths and 249 injuries due to exposure, as well as radioactive environmental contamination. IAEA, "The Radiological Accident in Goiânia", Vienna, 1988, at pp. 1-2, IAEA Doc. STI/PUB/815

[349] For the Tokaimora accident, see chapter 2 of the study.

[350] The Goiânia accident was the first accident in which the IAEA acted in accordance with the Assistance Convention. IAEA, "The Radiological Accident in Goiânia", 1988, at p. 111.

[351] For the Fukushima accident, see chapter 2 of the study.

The failure of the State Parties to fulfil the obligations of the Notification Convention may incur State responsibility under the general principles of international law for damage suffered by other States as the result of a nuclear accident.[352] Nevertheless, the Convention contains certain gaps which should be addressed in future amendments of the Convention. The Convention leaves a large margin of discretion to the Accident State and this reduces the effectiveness of the principle of notification.[353] It was argued that

> 'The Convention leaves it to the source State to decide whether an accident is significant and is likely to cause an international transboundary release. In theory, a failure to notify may therefore be excused on the ground that the State in which the accident occurred did not appreciate the gravity of the situation. Moreover, a purely domestic release (or, in any case, a release not necessarily the consequence of an accident [as] implied by the Convention) does not come within the scope of the Article, nor do releases over areas, such as the high seas, which are not subject to the sovereignty or jurisdiction of any State. Nonetheless, Article 3 permits States to interpret the Convention broadly and to notify in a potentially wide range of circumstances, left undefined...'[354]

Moreover, the scope of the Convention covers nuclear accidents caused by nuclear activities used for peaceful purposes but excludes accidents caused by military activities.[355] A nuclear accident caused by a military activity may be subject to the voluntary commitment of nuclear weapon States to apply the provisions of the Convention.[356]

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[352] Boyle, BYIL, Vol. 60, 1989, at p. 285.

[353] Krateros Iōannou, "Nuclear Energy, Peaceful Uses", in: EPIL, Vol. 3, 1997, pp. 700-705, at p. 704.

[354] M. Pohtim, "The Vienna Convention of 1986 Early Notification and Assistance in the Case of a Nuclear Accident or Radiological Emergency", unpublished paper given at Nuclear Inter Jura'86, International Nuclear Law Association Conference, Antwerpen, 21-25 September, 1987, p. 6, cited in Cameron, 1988, at p. 24.

[355] See, Article 1 of the 1986 Convention on Early Notification of a Nuclear Accident, 1439 U.N.T.S., at p. 276.

[356] El Baradei, Nwogugu and Rames, 1993, p. 1247. It was also argued that, '[t]he Notification Convention has been described as going no further than pre-existing customary international law and in some cases less far. Moreover, it applies only to non-military nuclear accidents; it fails to require that intervention levels for the introduction of protective measures (e.g. sheltering and evacuation) be set in advance by national authorities; it leaves it to the discretion of the State in whose territory or under whose jurisdiction or control the accident has occurred to determine what is or is not of radiological safety significance and what are the chances that another State would be affected, and accordingly whether notification is required; and it does not establish any obligation on States giving or receiving information to make it available to the members of the public. In comparison to other international instruments adopted since the Chernobyl accident on

The Convention, as mentioned above, does not include provisions for providing information to the public about an accident.[357] Furthermore, although the Convention indicates that the information provided about an accident should be accurate and transparent,[358] it does not provide an objective definition of the obligation of notification, nor does it require States to acquire and use monitoring equipment for notification.[359]

Finally, the Convention states that a State Party should directly notify the State likely to be affected by a nuclear accident or the IAEA, but it does not specify which State Party should give notification of the accident.[360] The term "State Party" is too broad, because it could include each State Party to the Convention, the State in whose territory or jurisdiction the accident has occurred, the State Party affected by the accident, and a State Party not affected by the accident. The Convention should specify the State responsible for notifying and providing information about a nuclear accident. It should mandate that the Accident State promptly notify and provide the relevant information about the accident. This is because it is in the best position to obtain information about a nuclear accident caused by a nuclear activity conducted within its territory or under its jurisdiction or control and must provide the relevant information related to the activity which caused the accident.[361] Accordingly, it is responsible for its failure to fulfil that obligation.

5.3.3 The 1986 Assistance Convention

It should be noted that the original rule of mutual assistance in the case of a nuclear accident or emergency situation prior to the Assistance Convention was an international moral and social rule. According to this social rule, a State was obliged to assist other States and their citizens when they suffered damage caused by natural catastrophes. However, this rule has been transformed from a moral rule into an obligatory legal rule following the need to apply it after the development of new technology.[362] After the Chernobyl

similar matters, such as the 1992 UNECE Industrial Accident Convention (which does not apply to nuclear accidents) it is notably less comprehensive or stringent'. Sands, RECIEL, Vol. 5, Issue 3, 1996, at p. 200.

[357] Sands, 1988, at p. 42.

[358] Article 5 of the 1986 Convention on Early Notification of a Nuclear Accident, 1439 U.N.T.S., at p. 278.

[359] Redgwell, 2007, at p. 76.

[360] Article 2 of the 1986 Convention on Early Notification of a Nuclear Accident.

[361] Article 5 of the 1986 Convention on Early Notification of a Nuclear Accident, 1439 U.N.T.S., at p. 278.

[362] Hamid Sultan, Asha Ratib and Salah Amer, "Public International Law", (Arabic edition) Cairo 1987, at p. 23.

accident this obligation was codified in the Assistance Convention.[363] This Convention developed an international framework to facilitate prompt assistance and co-operation in the event of a nuclear accident or a radiological emergency.[364] It obliges the State Parties to co-operate with other States and the IAEA to facilitate prompt assistance in the event of a nuclear accident or radiological emergency in order to minimize its consequence and to protect life, property and the environment from the resulting radioactivity.[365] The assistance can be provided through bilateral or multilateral arrangements or with a combination of both where appropriate.[366]

The Convention adopted certain obligations governing the assistance and cooperation between States in the case of a nuclear accident or radiological emergency. These obligations must be fulfilled by the State requesting the assistance, the State Parties, and the IAEA.[367] The State Parties are obliged to provide assistance whether or not the accident occurred within the territory, jurisdiction, or control of the State requesting the assistance. The assistance can be requested directly from any State Party, the IAEA, or any international governmental organization.[368] The Convention obliges the State requesting the assistance to specify the scope, type, nature and extent of the assistance and to provide the necessary information to the State receiving such a request.[369] This information enables the receiving State to promptly evaluate its capability as regards providing the required assistance. Thus the State receiving the request is obliged to promptly decide and notify the requesting State if it is in a position to provide the assistance as well as the scope and terms of any provided assistance.[370] In addition, the States Parties are obliged, within the limit of their capabilities, to identify and notify the IAEA of the available experts, equipment and material, and financial assistance as well as the terms of assistance that should be provided to other State Parties in case of a nuclear accident or radiological emergency.[371] Finally, the IAEA is obliged to allocate appropriate resources for the emergency assistance, to transmit information and necessary resources, and to coordinate

[363] Moser, NLB, No. 44, 1989, pp. 10-23.
[364] The Preamble of the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency , Sept. 26, 1986, S. Treaty Doc. No. 100-4, 1457 U.N.T.S. 133, p. 134.
[365] Article 1 (1) of the 1986 Assistance Convention.
[366] Article 1 (2) of the 1986 Assistance Convention.
[367] Article 2 of the 1986 Assistance Convention.
[368] Article 2 (1) of the 1986 Assistance Convention.
[369] Article 2 (2) of the 1986 Assistance Convention.
[370] Article 2 (3) of the 1986 Assistance Convention.
[371] Article 2 (4) of the 1986 Assistance Convention.

the available assistance at the international level.[372] This increased the role of the IAEA as a channel of communication, providing information and promoting cooperation between States in case of a nuclear accident and emergency situations.[373]

There are also other provisions necessary for providing assistance. These include provisions relating to: the direction and control of the assistance; competent authorities and points of contact; functions of the Agency; confidentiality and public statements; reimbursement of costs; privileges, immunities and facilities; transit of personnel, equipment and property; claims and compensation; termination of assistance; relationship to other international agreements; and settlement of disputes.[374]

Despite the fact that the Assistance Convention, like the Early Notification Convention is considered an innovation in international law and clarified the issues of assistance and cooperation between States in the rules of customary international law, it was criticized by some jurists.[375] It was argued that the State receiving the assistance is responsible for all damage caused to the assisting State, while the later is not responsible for damage caused to the former.[376] As Boyle remarked:

> 'No explicit obligation to render assistance is placed on other States, however, even where an installation within their territory is the cause of harm, nor is there any provision for joint contingency planning comparable to that found in many maritime treaties.
>
> Thus, in general, the Convention facilitates, but does not require, a response to nuclear accidents or emergencies. Its main achievement is to give assisting States and their personal immunity from legal proceedings brought by the requesting State, and an indemnity for proceedings brought by others. However, these provisions are open to reservation'.[377]

Moreover, the Convention includes no clear provisions to oblige the States Parties to render or to accept assistance in case of a nuclear accident or radiological emergency.[378] The scope of the Convention has a wider application, but does not create a right to assistance for the requesting State.[379] Also, the

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[372] Article 2 (6) of the 1986 Assistance Convention.
[373] Sands, 1988, at p. 47.
[374] For the provisions of these issues see respectively Articles 3-13 of the 1986 Assistance Convention.
[375] Sands, 1988, at p. 47.
[376] Sands, 1988, at p. 47.
[377] Boyle, BYIL, Vol. 60, 1989, at p. 284.
[378] Cameron, 1988, at p. 27; Pelzer, ADV, Vol. 25, 1987, at p. 305.
[379] Iōannou, EPIL, Vol. 3, 1997, at p. 704.

State party from which assistance is requested is only obliged to decide promptly whether it is in a position to provide the assistance requested.[380] Finally, the provisions of the Convention have not been accepted by all the Member States, as there are a number of reservations by States, particularly in the field of dispute settlement.[381]

5.4 Conclusions

An examination of this chapter reveals that the Installation State must comply with certain procedural obligations under international law before commencing a nuclear activity.[382] The State is obliged to establish a regulatory regime to organize the operation of the activity. Such a regime must contain, for example, regulations for nuclear safety, nuclear waste and liability for damage caused by the activity. It must determine the person liable for the operation of the activity and issue a prior authorization for the operation of the activity.[383] The State is also obliged to make sure that an assessment of the potential risks which might arise from the operation of the activity has been carried out and continues to be taken during the operation.[384] This assessment must be carried out by the operating body and supervised by the competent authorities of the Installation State.[385] Moreover, the Installation State is obliged to inspect nuclear installations and apply nuclear safety standards. The regulatory body in the Installation State is the competent nuclear institution responsible for drawing up these standards, usually in line with those adopted by the IAEA, and ensuring the compliance of the operating

[380] Iōannou, EPIL, Vol. 3, 1997, at p. 704.

[381] Cameron, 1988, at p. 29; Michael S. Horn, "Nuclear Energy Safety", in: HILJ; Vol. 28, 1987, pp. 558-567, at p. 558. Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Declarations/Reservations Made Upon Expressing Consent to be Bound and Objections thereto, 24 September 2009, International Atomic Emergency Agency, available at http://www.iaea.org/Publications/Documents/Conventions/cacnare_reserv.pdf (accessed on 25.3.2010).

[382] Article 5 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.

[383] The regulatory body in the Installation State is responsible for issuing an authorization for the proposed activity and for determining the procedural requirements and responsibilities of the authorized person or entity, see Carlton Stoiber, Abdelmadjid Cherf, Wolfram Tonhauser and Maria de Lourdes Vez Carmona, "Handbook on Nuclear Law: Implementing Legislation", IAEA Vienna 2010, at pp. 37-38, available at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1456_web.pdf (14.9.2010).

[384] Stoiber, Cherf, Tonhauser and Carmona, 2010, at pp. 63-64.

[385] Lammers, HYIL, Vol. 14, 2001, at p. 13.

body with the regulations that have been drawn up.[386] In addition, the Installation State is obliged to cooperate with other States and international institutions in good faith, particularly with neighbouring States, and to provide them with the necessary information regarding the operation of the activity.[387] If a nuclear accident occurs, the Installation State must quickly notify other States likely to be affected by the accident and the competent international organizations.[388] Furthermore, other States are required to cooperate with the Source State to provide international assistance if a major nuclear accident occurs.[389] This requires close cooperation between the Source State, the States likely to be affected by a nuclear accident and the international organizations concerned, as without such cooperation, it is difficult to prevent damage caused by a nuclear accident. Thus the principle of cooperation is a fundamental principle in international law required to prevent a nuclear accident and damage caused to the environment by nuclear activities conducted within the territory, jurisdiction, or control of the State.[390] It is also an inherent element and a direct consequence of States' sovereign responsibility for damage caused by such activities.[391]

These procedural obligations have been embodied in a large number of international instruments and in the 2001 ILC Draft Articles on Prevention of Transboundary Harm which are considered a progressive development in international law. The Articles include a number of obligations related to the management of risks caused by hazardous activities and the involvement of the State of origin and the States likely to be affected by such risks. Some progressive developments include, for example, the obligation to inform the public[392] and the obligation to allow victims access to national and international legal systems. These obligations were adopted in the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities.[393]

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[386] Stoiber, Baer, Pelzer and Tonhauser, 2003, at p. 65-66.

[387] For the principle of cooperation as a general principle in international law see, Perrez, 2000, at pp. 264-271, and international environmental law principle, at pp. 271-303.

[388] Article 2 of the 1986 Notification Convention.

[389] Article 1 of the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, IAEA Doc. INFCIRC/336 (Sept. 26, 1986).

[390] See "The MOX Plant Case (Ireland v. United Kingdom)" in: Karen Lee (ed.), International Environmental Law in International Tribunals, International Environmental Law Reports, Vol. 5, 2007, pp. 421-444, at p. 431.

[391] Perrez, 2000, p. 339.

[392] Article 13 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm.

[393] Principle 6 of the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm.

Moreover, the Articles reveal that preventing a nuclear accident is based on the provision of the necessary information by the Source State, States likely to be affected by a nuclear accident and the international organizations concerned.[394] The information is also necessary to increase the public awareness concerning nuclear issues and to participate in decision making.[395] Moreover, it gives the international community the chance to observe and ensure the implementation of international obligations by the Source State.[396] The violation of these obligations incurs State responsibility, even if no environmental damage has been caused by the activity.[397]

Nevertheless, the MOX Plant Case showed that the implementation of these obligations is still vague and difficult to apply in practice,[398] particularly as the information necessary to prevent and reduce damage caused by nuclear activities is related to nuclear technology. Such information is often not provided by the Source State to other States because information related to nuclear technology and national security is considered to be secret.[399] The drafters of the ILC Draft Articles on Prevention of Transboundary Harm were aware of this and included an article obliging the Source State to cooperate in providing information related to the national security of the State, industrial secrets, and intellectual property.[400] Moreover, in the 1986 Conventions on Assurance it remains unclear which State must provide assistance in the event of a nuclear accident or radiological emergency, and which State is entitled to receive assistance. Finally, there is no obligation on

[394] Farrajota, 2005, at p. 305.
[395] Sands, 2003, at p. 826; Principle 10 of the 1992 Rio Declaration; Smets, 1991, at p. 452.
[396] Sands, 2003, at p. 826.
[397] Article 12 of the ILC 2001 Draft Articles on State responsibility.
[398] The Tribunal ordered Ireland and UK to cooperate and consult each other and to exchange the relevant information related to the possible consequences might be caused by the operation of the MOX Plant and to take the preventive measures to prevent damage caused to the marine environment of the Irish Sea during the operation of the Plant. See Para. 89 (1), the 3 December 2001 Order; "The MOX Plant Case (Ireland v. United Kingdom)" in: Karen Lee (ed.), International Environmental Law in International Tribunals, International Environmental Law Reports, Vol. 5, 2007, pp. 421-444, at p. 432.
[399] Article 9 of the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OAPAR), Sept. 22, 1992, 2354 U.N.T.S., p. 70.
[400] Article 14 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm; also see Articles 20 and 21 of the 2000 Cartagena Protocol on Biosafety to the Convention on Biological Diversity; Article 9 of the 2001 Stockholm Convention on the Persistent Organic Pollutions.

the State from which assistance is requested to render that assistance and no obligation on the State requesting assistance to accept assistance.[401]

In conclusion, nuclear installations are very hazardous and nuclear activities must be conducted with caution. International law has therefore established a regulatory mechanism which includes certain procedures and rules to ensure the safe operation of such installations and to prevent and reduce damage caused by such installations to people and the environment. These obligations must be fulfilled by the Installation State, the affected States and the international organizations concerned during the economic lifetime of a nuclear installation. They apply during the preparation, operation and decommissioning of nuclear installations. Before the construction of a nuclear installation, the Installation State must establish a comprehensive national nuclear regime to organize the operation of nuclear activities. This must include regulations for nuclear safety, transport of nuclear material, decommissioning, disposal of waste, and liability for damage caused by such activities. The Installation State must also establish a regulatory body to supervise the application of the regime and to designate the operator responsible for the operation of the installation. It must select the site of the installation in a place which does not pose any risk to people and the environment and perform an environmental impact assessment of the site and continue to carry out such assessments during the lifetime of the installation to ensure that the installation does not pose risks to the environment. It should also deal with the issues of nuclear safety and inspect the installation to ensure that the operating body has correctly applied nuclear safety standards. The application of the standards of nuclear safety is an important aspect for the prevention of nuclear accidents. Moreover, the Source States should cooperate with States affected by these activities from the planning of the activity through the operation of the activity. Source States should provide prior notification, consult, negotiate, and exchange information with potentially affected States, particularly neighbouring States, in order to establish an acceptable regime to avoid and reduce environmental consequences caused by the activity. They should ensure that conducting the activity is acceptable to the public by providing the necessary information to make the public aware of the activity and allow participation in decision making related to nuclear activities. Finally, they must inform other States and international organizations in the event of a nuclear accident and cooperate with them to recover from such an accident. These obligations must be carried out by the Installation State with the cooperation of other States and international organiza-

[401] Cameron, 1988, at p. 27; Pelzer, ADV, Vol. 25, 1987, at p. 305.

tions, particularly the IAEA which plays an important role in assisting States to ensure the safe operation of nuclear installations.

PART III:

STATE RESPONSIBILITY AND LIABILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY A NUCLEAR ACCIDENT UNDER THE GENERAL RULES OF INTERNATIONAL LAW: REPARATIVE FUNCTION OF INTERNATIONAL LIABILITY

Introduction

As indicated, international responsibility in the context of environmental nuclear damage has two functions: the preventive function, aimed at the prevention and reduction of environmental damage caused by a nuclear accident, and the reparative function, aimed at the reparation of the damage caused by such activities.[1] Part II of the study presented the primary obligations of international liability as a preventive function. These primary obligations are basically procedural, aimed at organizing nuclear activities, which are hazardous activities not prohibited by international law in order to prevent and minimize environmental damage caused by nuclear accidents. If these obligations are violated, the State incurs responsibility for wrongful acts, regardless of whether such a violation entails physical environmental damage across borders. According to the ILC Draft Articles on State Responsibility for Wrongful Acts, the legal consequences of such responsibility are an obligation for the State to stop the illegal activities causing the violation,[2] and to repair the material and moral damage caused by such a violation.[3] This is particularly important in relation to the prevention of environmental damage caused by nuclear activities in the case of a violation of environmental obligations. The cessation and guarantee of non-repetition of the wrongful act is a secondary obligation incurred by the responsible State as a preventive measure against environmental damage. The preventive function of international liability is evident in this obligation. In addition, State liability may give apply when environmental damage caused by a nuclear accident in a particular country affects several countries. Under international law, the reparative function of international liability compels a State responsible for damage caused by a wrongful act or by a lawful activity to repair such damage.[4] The reparative function is the main focus of the current part of the study.

To examine State responsibility and liability as a reparative function, this part of the study attempts to answer the following questions: Who is liable for damage caused by a nuclear activity? Is it the State in whose territory the

[1] Hanqin, 2003, at p. 73.
[2] Article 30 (a) of the 2001 ILC Draft Articles on State Responsibility.
[3] Article 31 of the 2001 ILC Draft Articles on State Responsibility; Rosalyn Higgins, "Problems and Process: International Law and How We Use It", Clarendon Press. Oxford, Oxford University Press, New York, 1994, reprinted in 2007, at p. 163.
[4] Lefeber, 1996, at p. 1; Tim Stephens, "International Courts and Environmental Protection", Cambridge University Press, New York, Melbourne, Madrid, Cape Town, Singapore, 2009, at p. 66.

installation is located or under whose jurisdiction or control is operated, or is it the operator of the installation? What is the applicable regime as regards liability? Does international law impose upon the State certain standards of responsibility? If so, what sort of standards? Is the State responsible for any breach of an international obligation or only for damage, or for both? In the case of State responsibility, is the State responsible for the reparation of the damage? What is the basis of the liability incurred by the State? Is it based on the concept of responsibility for a wrongful act or absolute liability? What are the consequences of liability?

Answering these questions elucidates the applicable rules of international liability and reparation for a wrongful act resulting from the violation of environmental obligations and environmental damage resulting from a nuclear accident caused by a nuclear reactor installation. As indicated, State responsibility for violating its obligations is based on responsibility for a wrongful act, while State liability for environmental damage caused by nuclear activities as lawful activities is based on risk liability or absolute liability. However, State liability for nuclear damage is essentially based on the absolute liability which would apply to environmental damage caused by a nuclear accident, even if such damage is caused as a result of a violation of international obligations. This is because 'the relevance of state responsibility falls behind the relevance of state liability, when the cause of contingent damages is a lawful act as a rule'.[5]

Three elements are necessary for State responsibility for a wrongful act, viz. the fact that the State has committed a wrongful act, attributing the act to the State, and damage caused as a result of the act.[6] However, the absolute liability of the State for environmental damage is based on the element of damage resulting from a nuclear accident caused by a nuclear activity without the need to prove fault or negligence or a wrongful act by a State. Under international liability theories, State responsibility and liability for environmental damage caused by nuclear activities is based on at least one of the sources of international law. The element of damage was examined in chapter 3, while other elements of State liability will be examined in this part of the study on the basis of sources of international law.[7] These sources of in-

[5] Kecskés, AJH, Vol. 49, No. 2, 2008, at p. 227.

[6] According to Article 2 of the ILC Draft Articles on State Responsibility for Internationally Wrongful Acts, two constituent elements of an international wrongful act are necessary for State responsibility including the breach or omission of an obligation by a State and attribution of the conduct to a State. However, the element of damage, as mentioned, is a controversial issue. See Crawford, 2002, at p. 81.

[7] According to Article 38 (1) of the ICJ Statute, sources of international law applicable before the Court are respectively: international conventions, international custom; the

ternational law serve as the origin and basis of State liability under international law for environmental damage caused by a nuclear accident. As long as there is no inter-state treaty to govern international liability for nuclear damage, related issues are examined on the basis of the general rules and customary principles of international law and other State practices. The general rules of international liability have been embodied in the ILC Draft Articles on State Responsibility for Wrongful Acts[8] and Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities,[9] which apply to environmental damage caused by nuclear activities in the absence of an inter-state treaty. Therefore, international liability, as a reparative function for environmental damage caused by such activities, will be examined in the light of these Draft Articles and Principles.[10]

This part of the study is divided into four chapters. Chapter 6 identifies the liable person and the applicable regime of liability for environmental damage caused by a nuclear accident. It identifies whether the liable person is the State or the operator of the installation or both, and whether the applicable regime is a civil or international nuclear liability regime or both. Chapter 7 analyses State responsibility for wrongful acts and the relevant condi-

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general principles of law recognized by civilized nations; and judicial decisions and the teachings of the most highly qualified publicists of the various nations. However, this Article does not refer to other valuable sources of international law that can contribute to develop international law, e.g. the unilateral acts of international law, decisions and resolutions of international bodies and principles of equity and justice. See The ICJ, "The International Court of Justice, 1946-1996", fourth edition, ICJ, The Hague, ICJ, 1996, at p. 90.

[8] For text of the 2001 Draft Articles on State responsibility with commentaries and the 2001 Draft Articles on prevention of transboundary harm with commentaries see, UN General Assembly, Official Records, Fifty-sixth Session, Supplement No. 10 (A/56/10), available at: http://www.un.org/documents/ga/docs/56/a5610.pdf (accessed on 7.1.2011).

[9] The 2006 Draft Principles on the Allocation in the Case of Transboundary Harm Arising Out of Hazardous Activities, with commentaries in 2006, and submitted to the General Assembly (A/61/10), at p. 110, para. 67; UN General Assembly Resolution, A/RES/61/36, adopted at its Sixty-first session, 64th plenary meeting, 4 December 2006, available at: http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N06/496/59/PDF/N0649659.pdf?OpenElement (accessed on 11.4.2012).

[10] Despite the fact that the liability of a State for environmental damage caused by a nuclear accident is based on the principle of absolute liability, this part of the study will commence by examining the issues of State responsibility for wrongful acts and then absolute liability. This is because it is assumed that before the occurrence of a nuclear accident, the State should conduct the nuclear activity under certain duties and procedural obligations in order to prevent nuclear accidents. Under international law, the State is responsible for the violation of these duties, even if no a nuclear accident has occurred.

tions for State responsibility for the violation and omission of its environmental obligations under international law in the light of the recent rules of international liability as adopted by the ILC Draft Articles on State responsibility for wrongful acts. Chapter 8 investigates the concept of strict or absolute liability of a State for environmental damage caused by a nuclear accident under the general rules of international law. Finally, Chapter 9 ex-examines the legal consequences of international liability for environmental nuclear damage and forms of reparation according to the general rules of international law. This determines which form of reparation can be imposed upon the State and is relevant to prevent, reduce and repair environmental damage caused by nuclear accidents.

6 THE LIABLE PERSON AND APPLICABLE REGIME OF LIABILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY A NUCLEAR ACCIDENT

6.1 Introduction

The main aim of any liability regime is to provide financial protection to repair damage caused by an act or activity to the injured persons, natural or legal persons, States or individuals, regardless of the applicable regime, whether it is an international or national regime.[1] This aim is particularly difficult to achieve in respect of environmental damage caused by a nuclear accident. The Chernobyl accident demonstrated that neither the existing international nuclear civil liability regime nor the regime of liability under the general rules of international law were appropriate and adequate to repair environmental nuclear damage, if each regime is applied on its own.[2] Therefore, during the amendment of the nuclear liability conventions it was suggested combining and integrating the rules governing liability for nuclear damage under international and civil liability in one unified global nuclear liability regime.[3] The ILC made a similar proposal in the codification of international liability for hazardous activities in general. The proposals were aimed at filling the gaps in the two liability regimes with the adoption of some liability principles from the nuclear civil liability regime in the international liability regime and *vice versa,* or to apply both regimes in case of environmental nuclear damage.[4] Indeed, civil liability was given priority in liability for environmental damage caused by nuclear activities. This is due to the fact that most hazardous activities are operated by private enterprises. Furthermore, the application of the nuclear civil liability regime is in the interests of victims who suffer environmental damage caused by nuclear activities because it minimises the time and effort taken for victims to be compensated.[5] Accordingly, the ILC included certain elements of civil liability in its Draft

[1] Karl Zemanek, "State Responsibility and Liability", in: W. Lang, H. Neuhold and Karl Zemanek (eds.), Environmental Protection and International Law, Graham & Trotman /Martinus Nijhoff, London/Dordrecht/Boston, 1991, pp. 187-201, at p. 196.
[2] See SCNL/3/INF.2/Rev.1, Annex III; SCNL/4/INF.6, at p. 5.
[3] Schwartz, 2006, at p. 62.
[4] YILC, 1994, Vol. II, Part Two, at p. 156.
[5] Pelzer, 1994, at p. 273.

Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities.[6]

Nevertheless, the two liability systems remain distinct from each other and each one has its own characteristics. The distinction between international liability and civil liability questions may obscure the essence of the issue.

- The concept of international liability as adopted by the ILC is composed of two mechanisms of liability, i.e. responsibility of a State for its wrongful acts[7] and liability of a State for damage caused by lawful activities.[8]
- The international nuclear civil liability regime[9] imposes the obligation upon the State to provide public funds in addition to the operator's liability amounts and where the operator of a nuclear installation is unable to fulfil his financial obligations.[10]

These differences render any regime of liability composed of elements of the two liability regimes all the more complicated.[11] Following the Chernobyl accident, the IAEA Standing Committee on Liability for Nuclear Damage (hereinafter the "Standing Committee") examined the existing nuclear liability regime and reached the conclusion that the regime is incapable of governing liability for nuclear damage without the integration of international and civil liability regimes in a single unified regime.[12] The Standing Committee there-

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[6] Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities, adopted at the 58th session of the ILC in 2006 and submitted to the General Assembly (A/61/10).

[7] For the text of the 2001 Draft Articles on State Responsibility for Wrongful Acts with commentaries see official records of the General Assembly, 56th Session, Supplement No. 10 (A/56/10), ch. V.

[8] 2006 Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities (A/61/10), at p. 110, para. 67.

[9] I.e. the 1963 Brussels Supplementary Convention and the 1997 Convention on Supplementary Compensation.

[10] Sands, 2003, at p. 870.

[11] Boyle, Alan, "Relationship between International Environmental Law and Other Branches of International Law", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 125-146, at p. 133.

[12] For the mandate of the Standing Committee see, IAEA document GOV/2427 cited in Note by the Secretariat, Liability for Nuclear Damage IAEA Board of Governors, IAEA Doc. GOV/INF/822-GC(41)INF/13, 19 September 1997, available at: http://www.iaea.org/About/Policy/GC/GC41/GC41InfDocuments/English/gc41inf-13_en.pdf (accessed on 25.4.2012), at p. 1; Measures to Strengthen International Cooperation in Matters Relating to Nuclear Safety and Radiological Protection: Liability for Nuclear Damage, Report by the Board of Governors and the Director General, Thirty-

fore examined the relationship between the international nuclear third party liability regime and the international liability regime. However, it could not arrive at any concrete conclusions.[13] The same view was expressed by the ILC during the codification of international liability for harmful consequences arising out of hazardous activities not prohibited by international law.[14]

Indeed, the issue of the combination of civil nuclear liability and international liability regimes gives rise to certain questions which will be analysed in this chapter. Most importantly: is there a relationship between the two liability regimes that facilitates their integration in one regime? What is the basis of that integration? If such integration appears feasible, is the State liable under national or international law?

The answer to these questions will determine which regime and type of liability would be applicable to environmental damage caused by nuclear activities, whether or not the existing international nuclear civil liability regime is sufficient to govern liability for nuclear damage, if there is still a need to apply the regime of liability under the general rules of international law or the combination of both in one unified regime. These questions are worth looking at given that the revised international nuclear third party liability regime adopted a broad definition of "nuclear damage", including environmental damage,[15] which has led to various problems related to the extent and insurability of such damage.[16]

Although there is a separation between the international and civil liability regimes, there remains, to some extent, a relationship between them,[17] par-

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sixth regular session Sub-item 12(d) of the provisional agenda (GC(XXXVI)/1001, IAEA General Conference, GC(XXXVI)/1009, 1 July 1992, at p. 1, available at: http://www.iaea.org/About/Policy/GC/GC36/GC36Documents/English/gc36-1009_en.pdf (accessed on 29.4.2012); Standing Committee on Liability for Nuclear Damage, 1st Session, SCNL/1/INF.4 (1990) at p. 1 and 2nd Session, SCNL/2/INF/2 (1990), at p. 2; IAEA, INLEX, 2004, at p. 19.

[13] IAEA, General Conference, 36th regular session, 1 July 1992, at p. 2.

[14] Hafner, Gerhard, "Liability and Compensation: 'Civil Liability' and Other Forms of Transnational Accountability (Review of Developments in International Environmental Law During 1991)", in: YIEL, Vol. 2, 1991, pp. 91-98, at p. 97.

[15] Article 1 (a) (vii) of the 2004 Protocol to Revise the Paris Convention on Third Party Liability in the Field of Nuclear Energy (not yet in force); Article I (1) (k) of the 1997 Vienna Convention on Civil Liability for Nuclear Damage and Article I (f) of the Convention on Supplementary Compensation for Nuclear Damage.

[16] See Sebastiaan M. S. Reitsma and Mark G. Tetley, "Insurance of Nuclear Risks", in: NEA, 2010, pp. 387-412, at p. 405.

[17] See YILC, 1994, Vol. II, Part Two, pp. 155-156; Lefeber, 1996, pp. 299-311; Handl, 1993, pp. 497-520; Gadkowski, 1989, at pp. 76-78; La Fayette, NLB, No. 50, 1992, pp. 7-34; Wolfgang Friedmann, "The Uses of 'General Principles' in Development of International Law", in: AJIL, 1963, Vol. 57, pp. 279-317. For the relationship between inter-

ticularly with regard to liability for environmental damage in the field of nuclear energy. Indeed, the obligation of a State to intervene and compensate nuclear damage caused by major nuclear accidents has been under discussion by the authors of the nuclear liability conventions and the nuclear liability law doctrine since the very establishment of the regime. This issue is controversial bringing forward four different opinions over the nature and extent of the State intervention to compensate nuclear damage. The first trend rejects any involvement of the State to compensate environmental nuclear damage, and does not accept the principle of State intervention as a legal obligation in the nuclear liability regime. It places liability for nuclear damage only upon the operator of a nuclear installation. The second trend, which was adopted in the nuclear third party liability conventions, supports State intervention as a public entity to compensate nuclear damage. The third trend calls for State intervention as an international entity to compensate nuclear damage under the general rules of international law. This trend gained strong support after the Chernobyl accident, which revealed that the amount of compensation furnished by the State under the nuclear liability conventions is not sufficient to compensate all transboundary environmental nuclear damage caused by a major nuclear accident. Finally, another approach emerged after the accident, calling for the combination and integration of civil and State liability in one unified regime to compensate nuclear damage. This approach was supported by the IAEA Standing Committee and the ILC.

Under both the general rules of international law and the nuclear liability conventions, there are three possibilities to hold the operator and/or the State liable: first, the primary liability which is imposed on the operator of a nuclear installation or the State when it acts as an operator; secondly, compensation provided by the State in addition to the operator's liability and finally, the residual liability of the source State for damage caused by activities conducted within its territory or under its jurisdiction or control. These issues will be examined in the following four sections of this chapter respectively. Section 2 argues for the approach which rejects State intervention to repair environmental nuclear damage. Section 3 examines intervention by the State as a public entity under the nuclear liability conventions. Section 4 examines intervention by the State as an international entity under the general rules of international law. Section 5 argues for the integration of civil and international nuclear liability regimes. Finally, section 6 concludes that environmental damage caused by major nuclear accidents should be covered by the

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national and national law in general see, Eileen Denza, "The Relationship between International and National Law", in: Malcolm D. Evens, International Law, First addition, Oxford University Press, New York, 2003, pp. 415-472.

civil nuclear liability and international liability regimes, which should be a single unified regime.

6.2 Primary liability of the operator: Rejection of State intervention

At the beginning of the drafting of the nuclear liability conventions, several States refused to be involved or to intervene in any way in any kind of liability for nuclear damage caused by nuclear activities.[18] Thus the primary liability for nuclear damage under these conventions was imposed upon the operator of a nuclear installation. It was argued that there is no legal justification for the intervention of the State to compensate nuclear damage where the amount of the operator's liability is insufficient to cover all the nuclear damage caused by a nuclear accident. The operator is the only person liable for nuclear damage caused by his installation and should secure his liability with insurance or other financial security in order to fulfil his financial obligations. It was also argued that there is no reason to distinguish between risks involved in the nuclear industry and other industrial activities involving similar hazards, such as gas plants and industrial explosions.[19] As Kaufmann argues:

> 'The state does not [... compensate] the victims of an accident caused by private enterprise. If the damages exceed the amount of the insurance [... taken out] by the liable persons, the victims may press claims against the assets of the enterprise. If the assets are not sufficient, the enterprise goes into bankruptcy and all the creditors must be satisfied with their share. There is no reason to make an exception in the case of the private [... nuclear] industry. All the state has to do is to exercise a correct supervisory control. [... I]f a factory manufacturing explosives explodes and causes havoc, the state is not liable for the damages. Involvement of the state in the liability for non-insurable damages of the [... nuclear] industry would mean the socialization of a risk for which individual insurance should be carried by everybody. The fact that the state gives permission [...] to start a new industry [in the public interest and this ...] presents certain risks cannot justify [... the] financial involvement of the state, should an accident [... occur] at a later time'.[20]

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[18] Thomas Gehring and Markus Jachtenfuchs, "Liability for Transboundary Environmental Damage: Towards a General Liability Regime?" in: EJIL, Vol. 4, Issue 1, pp. 92-106, at p. 100. This article is available at: http://www.ejil.org/journal/Vol4/No1/art9-02.html (accessed on 12.5.2009) at p. 4.

[19] See for these arguments Mohamed, 1993, at p. 640.

[20] See, European Nuclear Energy Agency - Executive Committee; group of experts on civil liability; Report by O. K. Kaufmann, Paris, April 4, 1958, NE/LEG (58) 5: Inter-

Moreover, it was argued that State intervention to compensate nuclear damage is inconsistent with the general principles established under the nuclear liability conventions. According to one of these principles, i.e. exclusive liability, the operator of a nuclear installation is the only entity legally liable for damage regardless of whose act or omission was the actual cause of the accident. The intervention of the State would mean that liability for nuclear damage caused by the operator's installation would be borne by the whole community.[21] In other words, the burden of liability for nuclear damage would be, at least partly, taken from the operator and would be shared by every individual in the community via taxes.[22] As Perolo argues:

> '[T]he obligation on the part of the state to intervene is a new feature in the field of law. Intervention of the state means a shifting and redistribution of the damages of nuclear origin on the whole community. The state would simply play the role of a mutual company for the nuclear field. Once we start on such a road we don't know where it will lead. […T]he intervention of the state is not considered by us as an insurance which would warrant conditions able to overcome any competition; rather it is proposed in the form of a social guarantee available to the whole community of citizens'.[23]

Therefore, according to these arguments, '[i]ntervention of the state under any other form than insurance is nonsensical because ultimately it will threaten the solidity of the legal structure of nuclear agreements'.[24]

Ultimately, these arguments were not supported by either the international law doctrine or the majority of States, because it is not possible to compare the hazards involved in nuclear activities with other industrial activities. Nuclear energy has special characteristics and involves special hazards greater than those involved in other hazardous activities such as the oil industry. Nevertheless, the State has agreed to intervene and to compensate damage caused by those hazardous activities which caused less extensive environmental damage. Moreover, the principle of State intervention was not the only new legal liability principle introduced in the nuclear liability conventions. Other principles also were new but were nevertheless integrated in the same regime of the conventions. For example, the principle of liability channelling was new and was included in the legal regime of nuclear liabil-

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vention of the State for Damages Caused by Nuclear Installations, cited in Camier, 1962, at p. 52-53.

[21] Av. M. Perolo, "The Insurance of the Nuclear Risk", the Congress of Lausanne, June 30-July 8, 1958, cited in Camier, 1962, at p. 53.

[22] El Shaaraoui, 1981, at p. 380, cited in Mohamed, 1993, at p. 639.

[23] Perolo, 1958, cited in Camier, 1962, at p. 53.

[24] Perolo, 1958, cited in Camier, 1962, at p. 54.

ity.[25] Furthermore, there is no sufficient financial protection under the general principles of civil liability in the ordinary law to protect victims of nuclear damage and the operator of a nuclear installation where these principles are applied.[26] For example, victims of a nuclear accident may have to prove the fault of the operator if the general principles of civil liability are applied. This is a difficult task in case of the damage caused by nuclear energy. Moreover, the operator may be at risk of bankruptcy in the case of his unlimited liability under the general principles of liability.

Therefore, another approach emerged which does not reject intervention by the State to compensate nuclear damage caused by the nuclear industry, but which rejects any legal obligation on the part of the State in the case of such intervention and considers that the State has only a social or moral duty towards the victims.[27] This approach accepts the State's intervention in order to protect its citizens, but in a limited way and basically as a result of its obligation to supervise and control nuclear safety in nuclear installations. It is obliged to ensure that the nuclear safety measures are taken by the operator in accordance with international standards. The intervention of States is considered as a form of social guarantee and social solidarity to compensate not only the nuclear damage in the case of a major nuclear accident, but also the damage caused by catastrophes in other hazardous activities.[28]

However, this approach has not gained the support of the majority of States either, because the intervention of States to compensate nuclear damage as a type of social security does distinguish between the victims of a nuclear accident. While some victims of the accident would obtain compensation on the basis of the legal liability of the operator, others would depend on the social security provided by the State. Consequently, the amount of compensation received by victims of the accident would vary from one victim to another. Victims of a nuclear accident compensated under the legal regime of liability would have all the rights to compensation, while other victims would have only a social guarantee or social assistance from the State.[29]

Finally, at the present time, there is no support for such arguments, since the principle of State intervention has already been concluded in the nuclear liability conventions and national legislations. Thus under the nuclear liabil-

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[25] Mohamed, 1993, at p. 443.

[26] El-Shaaraoui, 1981, at p. 382; Mohamed, 1993, at p. 644.

[27] P. S. Rao, Second Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, ILC, Fifty-sixth session, Geneva, 3 May-4 June and 5 July-6Augst 2004, UN Doc. A/CN.4/540 (15 March 2004), at p. 18, para. 36; Gehring and Jachtenfuchs, EJIL, Vol. 4, Issue 1, 1993, at p. 106.

[28] Camier, 1962, at p. 53 and pp. 57-58.

[29] Mohamed, 1993, at p. 442.

ity conventions the State is obliged to provide additional compensation to compensate nuclear damage, including environmental damage, and also to protect the nuclear industry, as we will see below.

6.3 Secondary liability: Intervention by the State as a public body

According to this widely used approach, the State commits to provide additional funds to compensate victims of a nuclear accident.[30] This type of State intervention was introduced in the 1963 Brussels Supplementary Convention,[31] the 1997 Convention on Supplementary Compensation for Nuclear Damage[32] and the 1997 Vienna Convention on Civil Liability for Nuclear Damage.[33] Under these conventions, the State provides compensation in addition to the liability of the operator when the maximum liability amount imposed on the operator (if there is such a limitation) is reached, when the amount of the operator's liability is insufficient to compensate all the damage caused by a nuclear accident or when the operator is unable to fulfil his financial obligations. This is a secondary liability which cannot be attributed to the State until the financial means of the sole liable operator have been exhausted. However, as mentioned above, the liability of the State is still governed by national law and victims of a nuclear accident have to bring their claims for compensation before the national competent courts.[34] Such intervention is necessary in the absence of a conventional regime based on State liability for nuclear damage.

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[30] Lopuski, 1993, at p. 187.

[31] Article 3 of the Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960, as amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982 ("Brussels Supplementary Convention"). See the text of the Convention. Also see Bette, Didier, Fornasier and Stein, 1965, 1965, at p. 79. The test is also available at: http://www.nea.fr/law/nlbrussels.html (accessed on 1.6.2010).

[32] Article III of the 1997 Convention on Supplementary Compensation for Nuclear Damage, adopted at Vienna on 12 September 1997, for the text of the Convention, see Part I, SCNL/17.I/INF.7 and Part II, SCNL/17.II/INF.7. The text is also available at: http://www.iaea.org/Publications/Documents/Infcircs/1998/infcirc567.pdf (accessed on 1.6.2010).

[33] Article 7 of the 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, for the text of the Convention see Part I, SCNL/17.I/INF.7 and Part II, SCNL/17.II/INF.7. The text is also available at: http://www.iaea.org/Publications/Documents/Infcircs/1998/infcirc566.shtml (accessed on 1.6.2010)

[34] Dupuy, 1976, at p. 122.

There are several legal, political and economic considerations which justify the obligation of the State to contribute to the compensation for nuclear damage caused by nuclear activities.[35] Regarding the legal considerations, the State is empowered and has the legal authority to pursue or allow nuclear activities. It is entitled to enact legislation and regulations to govern all activities related to nuclear energy. The nuclear liability regime was established by the contracting parties with the aim of creating a developed and comprehensive liability framework which is able to compensate nuclear damage effectively. Therefore liability for nuclear damage is guaranteed by the Installation State in the absence of a nuclear liability regime applicable to nuclear damage caused by nuclear activities. It ensures that all victims of a nuclear accident are fully compensated by the operator. The balancing of interests between potential victims and the operator was also one of the grounds to justify State intervention as part of the nuclear liability regime. If the State allows the construction and operation of nuclear installations for its economic and social progress, it should contribute to the compensation of potential victims of nuclear damage caused by such installations where they cannot be compensated by the operator.[36] The State also has the right to licence and supervise the operation of nuclear installations within its territory or under its jurisdiction or control.[37] Although the prime responsibility rests with the operator of a nuclear installation, the State remains obliged to ensure the safe operation of nuclear installations and to ensure that such installations do not cause nuclear damage to innocent people and the environment.[38] If the State has allowed the operation of a nuclear activity, it should bear liability for nuclear damage caused by that activity.[39] Consequently, the State is obliged to intervene to compensate nuclear damage uncompensated by the operator where victims of a nuclear accident have not received compensation or have only been partly compensated.[40]

On the other hand, State intervention is necessary to promote the nuclear industry. This is because the amount of the operator's liability for nuclear damage is limited and State intervention is necessary to ensure that the op-

[35] Mohamed, 1993, at pp. 644-648.
[36] Pelzer, 1994, at p. 270.
[37] Pontavice, 1977, at p. 472.
[38] P. S. Rao, Second Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, ILC, Fifty-sixth session, Geneva, 3 May-4 June and 5 July-6Augst 2004, UN Doc. A/CN.4/540 (15 March 2004), at pp. 10-11, para. 27.
[39] Sam Blay and Julia Green, "The Development of a Liability Annex to the Madrid Protocol", in: EPL, Vol. 25, Issue 1 and 2, 1995, pp. 24-37, at p. 30.
[40] Camier, 1962, at p. 55.

erator is able to meet his financial obligations. This applies particularly in the case of environmental nuclear damage caused by a major nuclear accident which spreads over wide areas of the territory of the Contracting Party to the nuclear liability conventions. The damage, especially environmental damage, will almost certainly far exceed the financial capacity of the operator. As a result, many victims of a nuclear accident are left uncompensated. The Chernobyl and Fukushima accidents demonstrated that the operator of a nuclear installation is not able to cover all the damage caused by a major nuclear accident. Even if the liability of the operator is unlimited, there is no insurance which can financially secure such unlimited liability.[41] The rejection of any State responsibility would hinder the development of the nuclear industry. Thus States parties to the above-mentioned conventions have undertaken to provide supplementary compensation to victims who suffer nuclear damage where the amount of the operator's liability is limited in order to protect the operators and to encourage them to take part in the nuclear industry.[42] It is also 'justified by the need to reconcile the normal process of technological development, including the risks it involves, and the public authority's duty to guarantee the security of everyone'.[43] The State and its citizens are also beneficiaries of the production of nuclear energy which is reflected in their economic development and growth.[44] Consequently, the State shares the liability with the operator or at least bears part of the compensation in cases of nuclear damage caused by such activities.[45] In our view, limiting the operator's liability is not the main reason for intervention by the State to compensate nuclear damage. This is because the State agrees to intervene in the case that the operator's liability is unlimited. From the legal point of view, the State is obliged to intervene to compensate the innocent victims of a nuclear accident because, as a result of authorizing its operators to carry out nuclear activities, they were prevented from exercising their rights to live a normal life and enjoy a clean environment.[46] This right

[41] El-Shaaraoui, 1981, at p. 382; Mohamed, 1993, at p. 644.
[42] Mohamed, 1993, at p. 645.
[43] Miatello, "International Liability for the Use of Nuclear Energy", in: Spinedi and Simma, (eds.), 1987, pp 279-321, at p. 299.
[44] Nuclear energy is an alternative to traditional fuels, as these are limited. The possibility of a decline in the available resources of traditional fuels is not remote and they are likely to decline in the next few decades.
[45] Fadel, 1976, at p. 338.
[46] For the environmental rights, see John G. Merrills, "Environmental Rights", in: Bodansky, Brunnée and Hey (eds.), 2007, pp. 663-680; Dinah Shelton, "Human Rights and the Environment: What Specific Environmental Rights Have Been Recognized?" in: Stockinger, Van Dyke, Geistlinger, Fussek and Machart (eds.), 2007, pp. 125-166. This article is also published in DJILP, Vol. 35, No. 1, 2007, pp. 129-171; Luis E. Rodríguez-

is one of the principles which are recognized in constitutions of States[47] and the general principles of international law.[48] Intervention by the State is necessary to remove damage caused to victims of a nuclear accident and restore a level equivalent to the previous situation before the accident occurrence.

As regards the political considerations, State intervention to compensate nuclear damage might help the public to accept the nuclear industry.[49] Liability and compensation issues have always had an impact on the public's opinion, as the existence of sound financial protection mechanisms could help the public fear about the possible risks and damage involved. Although the nuclear industry has evolved and has become a strong economic player, the public interest in a developed economy and the corresponding public responsibility based on additional funds can be justified to the public.[50] The public will reject the nuclear industry if there is no financial protection and this will obviously impede the development of the nuclear industry. The State has realised that the development of the nuclear industry cannot be achieved without encouraging private investment and ensuring the protection of the public.[51] The political obstacles must be removed[52] as well as the legal and financial impediments.[53]

Finally, economic and social considerations justify State intervention because the State is interested in investments on its territory for which it has to provide certain incentives. One of the main incentives in this respect is the limitation of the operator's liability. In order to encourage investment and to protect potential victims at the same time, the State is bound to pay the difference between the maximum liability of the operator and the actual damage.[54] Furthermore, if the State does not intervene to compensate such damage in the case of a major nuclear accident, some of the victims cannot be

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Rivera, "Human Right to Environment and Peaceful Use of Nuclear Energy," in: Stockinger, Van Dyke, Geistlinger, Fussek and Machart (eds.), 2007, pp. 167-184. This article is published also in DJILP, Vol. 35, No. 1, 2006, pp. 173-192; Stephen A. Kuchta, "Fundamental Rights & Environmental Justice: Identifying Rights-Based Environmental Protection in Europe and the United States", Ph.D. thesis, Tilburg University, the Netherlands, 2010.

[47] See e.g., Article 45 (1) of the 1978 Spanish Constitution; Article 18 of Act XXXI, 1989, Constitution of Hungary; Article 22 of the 1991 Romanian Constitution. Referred to in Kiss and Shelton, 1997, at p. 84.

[48] See Principle 1 of the 1972 Stockholm Declaration.

[49] In general see, Ebbesson, 2007, pp. 681-703.

[50] Schwartz, 2006, p. 39.

[51] Mohamed, 1993, at p. 646.

[52] Camier, 1962, at p. 54.

[53] Schwartz, 2006, at p. 39; El-Shaaraoui, 1981, at p. 388; Mohamed, 1993, at p. 647.

[54] Schwartz, 2006, p. 39.

compensated. This creates discrimination among victims of a nuclear accident, and subsequently creates social instability in the State.[55] Therefore, the State and the operator share the compensation for damage caused by nuclear accidents.

6.4 Residual liability: Intervention by the State as an international entity

Since the early negotiations of the nuclear liability conventions, it was realised that these conventions cannot cover all liability for nuclear damage caused by a nuclear accident and the burden of the residual liability must be incurred by the State. To justify that liability it was stated that:

> '[I]n the case of the reactors, no private law, not even special legislation, can resolve the problem. The State, awarding the authorizations to construct a reactor, knows in advance that there might be victims who cannot be sufficiently protected by the principles of civil liability even if a compulsory insurance is required. So, if the State wants to have reactors constructed, it must take care of the problems in the law by means of an accessory liability of the State'.[56]

Under the existing nuclear liability conventions, the State has a limited role in comparison to its role under the general international liability regime.[57] The *status quo* is not a comprehensive solution to the problems of compensation, unless international liability has been recognised by the States and adopted in an international instrument.[58] This is mainly because liability for damage caused by nuclear installations under these conventions is governed by international private law, [59] and the amount of compensation is limited.

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[55] Mohamed, 1993, at p. 647.

[56] Camier, 1962, at p. 55. Also, it was stated that: 'If full knowledge of the cause, the state accepts the possible consequences of the construction of a reactor, thus accepting the fact that an undefined portion of the population could be exposed to radioactive contamination, thus becoming sacrificed in the common interest. This public danger must be the responsibility of the state which permitted the establishment of a risk which cannot be completely controlled. Its liability represents its contribution to the development of new forces which it promotes by the passing of special legislation'. As quoted, from the study prepared by the Study Centre of the Permanent Commission of the Atomic Risk, European Committee of Insurances. Information Bulletin No. 10, at p. 68, by Camier, 1962, at p. 55.

[57] See in general, Dupuy, 1976, pp. 118-139.

[58] See Council of Europe, European Commission Legal Co-operation (CDCJ), "Questions Relating to Public International Law", doc. (ACDCJ8811.), Strasbourg, 28 March 1988, Restricted CDCJ (88) 11, at p. 8, para. 25.

[59] Horbach and Bekker, 2002, at p. 434.

There are certain cases, such as transboundary environmental nuclear damage, the failure to identify the operator, exoneration of the operator from liability, a State not party to any nuclear liability convention etc.[60] where the source State is liable under international law for environmental damage caused by a nuclear accident and where claims for compensation must be brought before international courts because they cannot be settled under the civil liability regimes.[61] However, in these cases 'in order to hold the source State liable, a causal link must be established between the source State and the harm'.[62] It could be argued that the causal link which justifies the State's liability is the activity that has been carried out within its territory or under its jurisdiction or control, with its authorisation and that the accident has taken place as a result of such activity. Thus if it can be proven that the damage was caused by the activity, the liability must be attributed to the State without the need to prove fault or negligence. This is consistent with the absolute liability of the State which is attributed to it in the case of proof of a causal link between a hazardous activity and the injury.[63] However, if the State has failed to pursue due diligence with regard to the activity, this supports State responsibility for wrongful acts.

Such a liability of the source State for damage caused by hazardous activities under international law is supported by the international law doctrine.[64] It argues for the settlement of disputes under international (interstate) procedures before international courts.[65] Where damage cannot be compensated under the existing nuclear liability conventions, the Source State should bear the residual liability for environmental damage caused by a nuclear accident, rather than the innocent victims.[66] This approach gained increasing support, particularly after the Chernobyl accident.[67]

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[60] Rosas, NJIL, Vol. 60, Issue 1/2, 1991, at pp. 39-40.

[61] Johan G. Lammers, "General Principles of Law Recognized by Civilized Nations", in: Frist Kalshoven, Pieter Jan Kuyper and Johan G. Lammers (eds.), Essay on the Development of the International Legal Order: in Memory of Haro F. Van Panhuys, 1980, pp. 53-75.

[62] See Lefeber, 1996, at p. 300.

[63] See UN Doc. 6/44/SR/32, at p. 18, para. 91.

[64] Sands, 2003, at p. 909.

[65] Rosas, NJIL, Vol. 60, 1991, p. 37; Günther Doeker and Thomas Gerhing, "Private or International Liability for Transnational Environmental Damage-The Precedent of Conventional Liability Regimes", in: JEL, Vol. 2, No. 1, 1990, pp. 1-16, at p. 1.

[66] Lefeber, 1996, at p. 299.

[67] See in general, Barboza, RDC, Vol. 247, Part III, 1994, at pp. 393-405; Symposium on "State Responsibility and Liability for injurious Consequences Arising Out of Acts Not Prohibited by International Law", in: NYIL, Vol. XVI, 1985, pp. 3-300; Gehring and Jachtenfuchs, EJIL, Vol. 4, Issue 1, 1993, pp. 92-106; G. Handl, Après Tchernobyl: quelques

Nevertheless, States accepted full liability only for damage caused by space objects. Article II of the 1972 Convention on International Liability for Damage Caused by Space Objects[68] states that '[a] launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight'. Consequently the Source State is liable for damage caused by a space object under international law,[69] even if it was operated by a private enterprise. This convention is the only instrument in international law which provides for the liability of a State for damage caused by hazardous activities, including nuclear activities. It is an important instrument to cover environmental damage caused by space objects operated by nuclear power reactors, particularly because the nuclear liability conventions take a narrow view in this regard by excluding damage caused by space objects.[70] Furthermore, on 14 December 1992, the General Assembly of the United Nations adopted Resolution No. 47/68 concerning Principles Relevant to the Use of Nuclear Power Sources in Outer Space.[71] The resolution establishes non-binding principles on the use of nuclear power sources in outer space which provide a system of prevention, minimization of space objects and compensation of potential damage caused by such objects or their component parts.[72]

After the Chernobyl accident, the debate on this issue was intensified. As mentioned above, the accident demonstrated, irrespective of the fact that the former USSR was not party to any nuclear liability convention, that the amount of compensation provided by the operator's liability and the additional compensation provided *via* State intervention under the nuclear liability conventions was insufficient to fully compensate environmental damage caused by a nuclear accident.[73] It was argued that:

> 'Since the accident at Chernobyl, it has become evident that the existing nuclear civil liability regime is seriously deficient and must be replaced and that states must make a public commitment to nuclear safety, including the prevention of accidents and the mitigation of their consequences. The civil liability system suffers from flaws that are so fundamental that they cannot be remedied through a mere revision of the three main conventions involved. Instead, they should be replaced by a new convention on state responsibility for nuclear ac-

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réflexions sur le programme législatif multilateral a l'ordre du jour, in: RGDDIP, Vol. 92, 1988, pp. 5-62.

[68] The text reprinted in Hurwitz, 1992, pp. 213-221.

[69] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 10.

[70] Viikari, 2008, at p. 11.

[71] Benkö, Gruber and Schrogl, ZFLW (GJASL), Vol. 42, Issue 2, 1993, pp. 35-64.

[72] For liability and compensation see, Principles 8 and 9.

[73] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 135.

tivities, encompassing provisions on safety, accident prevention, and emergency response'.[74]

A debate on State intervention to compensate nuclear damage caused by a nuclear accident according to the general rules of international law took place during the amendment of the Vienna Convention. An inter-state treaty for nuclear damage was suggested[75] in order to create a comprehensive regime of international liability that includes rules on prevention, reduction and reparation of nuclear damage.[76]

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[74] La Fayette, NLB, No. 50, 1992, at p. 7.

[75] IAEA, Note by Director General, "The Question of International Liability for Damage Arising from a Nuclear Accident", 1987, IAEA Doc. Gov/INF/509, Annex; Horbach and Bekker, 2002, at p. 432; Sands, 2003, at p. 909; Sands, 1988, at p. 14; Adede, 1987, at p. 39.

[76] Proposal for additional provisions and amendment to the Vienna Convention submitted by the delegation of Italy on 11 April 1991 to insert a new article in the Convention (Article X. A, B and C), which provides as follows:

Article X. A

'1. Each Contracting Party shall have the responsibility to ensure that nuclear activities carried out in its territory or within its jurisdiction or control do not cause nuclear damage to other States or in areas beyond the limits of national jurisdiction.

2. Contracting parties shall take all appropriate legislative and administrative measures to prevent or minimize the risk of transboundary harm or, where necessary, to contain or minimize the harmful transboundary effects of nuclear activities carried out in their respective territory or under their jurisdiction or control. Contracting Parties shall also encourage the application of the best available technology to ensure that nuclear activities are conducted safely.

3. Contracting States shall cooperate in good faith, with one another and with the Agency, to develop agreed rules aimed at avoiding, reducing and controlling the harmful transboundary effects of nuclear activities. Such cooperation shall relate, in particular, to aspects of nuclear activities such as nuclear safety and radiation protection; scientific research and exchange of information on new safety-related technologies; physical protection of nuclear material; environmental impact assessments; radioactivity monitoring; contingency emergency planning; notification of emergency situations; emergency assistance and other mechanisms for mitigation of nuclear damage'.

Article X. B

'1. Every Contracting Party shall take immediate steps, in respect of any nuclear incident occurring in its territory or in areas within its jurisdiction or control, to prevent the release of radiation and minimize nuclear damage.

2. Every Contracting Party affected, or likely to be affected, by a nuclear incident occurring in the territory, or in areas within the jurisdiction or control of another State, shall take immediate steps to prevent nuclear damage in its territory or in areas within its jurisdiction or control, and minimize such damage.

3. In the event of a nuclear incident (or the serious likelihood of a nuclear incident), the Contracting State in the territory of which or under the jurisdiction of control of which the incident occurs (or may occur), shall:

Similarly, international liability for environmental damage caused by hazardous activities was subject of debate in the United Nations General Assembly (UNGA) Six Committee and the ILC during the codification of international liability for injurious consequences arising out of acts not prohibited by international law. The question was whether the liability of the State should replace the liability of the operator or whether the State should only bear the residual liability. Naturally, there were different points of view on which type of liability should be attributed to the State. There are three forms of State liability for damage caused by hazardous activities, full liability, residual liability or joint liability, as expressed by Mahiou in the following terms:

> 'The issue of reparation involved determining whether the victims should seek compensation from the State on the territory of which the harmful activity was taking place or from the operator, i.e. the person carrying out the activity. There were, in theory, three possible solutions: *(a)* sole liability on the part of the State; *(b)* sole liability on the part of the operator; or *(c)* joint liability,

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(a) forthwith notify, directly or through the Agency, those States, whether Contracting Parties or not, that may suffer nuclear damage, and the Agency, of the nuclear incident, its nature, the time of its occurrence and its exact location; and
(b) promptly provide the States referred to in sub-paragraph (a), directly or through the Agency, with such information as is relevant to minimizing nuclear damage in those States'.
Article X. C
'1. Each Contracting Party shall ensure that adequate reparation is provided if an incident involving a nuclear activity carried out in its territory or within its jurisdiction or control has caused significant damage within the territory or in areas within the jurisdiction or control of another Contracting Party. Such reparation shall be provided to the affected States (or States) regardless of other provisions of the present Convention concerning limits of liability of the operator, limits of intervention of supplementary funding, special exonerations, or definitions of compensable nuclear damage.
2. Compensation or other forms of reparation under para. 1 shall be determined by way of negotiations between the Installation State and the affected State (or States) or, in the absence of an agreement between the States concerned, by the International Tribunal established by the present Convention. However, an action under para. 1 can be brought in the Tribunal by the affected State (or States) against the Installation State only whenever the other mechanisms set forth by the present Convention to compensate nuclear damage cannot operate as a result of limits of liability of the operator, limits of intervention of supplementary funding, special exonerations, or definitions of compensable nuclear damage'. Proposal for Additional Provisions and Amendment to the Vienna Convention Submitted by the Delegations of Italy, 11 April 1991, Standing Committee on Liability for Nuclear Damage, Third Session, 8-12 April 1991, SCNL/3/INF.2/Rev.1, 23 April 1991.

> where the State had primary liability and the operator had residual liability or vice versa'.[77]

Accordingly, it was viewed that the State ought to be fully liable for damage caused by hazardous activities. The Source State would be primarily liable for such damage, even if the liability of the operator can be proven. As the delegate of Australia stated:

> 'States were free to enter into agreements under which such compensation would be provided in whole or part by the operator through a civil liability regime, but that did not alter the basic legal position that a State was liable to provide full compensation for damage caused by other States or their citizens by activities within its jurisdiction or control… A State should ensure through its regulatory system that activities were carried out in a way that would ensure that private operators had funds available to cover any compensation payment that the State would otherwise be obliged to meet'.[78]

According to this view, the Source State is subject to primary liability, residual liability and joint liability (together with the operator). This argument is consistent with the purposes of liability for damage caused by hazardous activity. Due to the importance of civil liability in remedying nuclear damage, liability must be directed to the operator of the nuclear installation. However, it should be attached to the State where for some reason the operator is exonerated from liability.[79] Also, some States support full liability of the State, but only in the case of a violation of its international obligations and if the absolute liability of a State for hazardous activities is included in a specific instrument.[80] According to this opinion, the liability should be assigned to the Source State where the obligation of due diligence has been breached. Nevertheless, despite the fact that the liability of a State is necessary for the protection of victims of nuclear damage, at the present time these arguments fail to convince the nuclear power States which do not accept any kind of liability for damage caused by hazardous activities.[81] In addition, it is difficult, in some cases, to replace the liability of the operator by the liability of

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[77] YILC, 1991, Vol. I, at p. 99, para. 15.

[78] UN. Doc. A/C.6/46/SR. 32, at p. 14, para. 52.

[79] Alan E. Boyle, "Remedying Harm to International Common Space and Resources: Compensation and Other Approaches", in: Wetterstein (ed.), 1997, pp. 83-100, at p. 91.

[80] As observed by the delegation of the United Kingdom: 'State responsibility should be engaged for failure by the State to provide adequate civil remedies'. UN. Doc. A/C.6/46/SR.32, p. 16, para. 61. 'Strict or residual liability should not be imposed on States not in breach of obligations, unless by virtue of other instruments designed to deal with specific problems'. UN Doc. A/C.6/46/SR.32, p.17, para. 61.

[81] Sands, 2003, at p. 909.

the State, because in principle the State is not liable under international law for acts of private persons. Also, the victims will face some difficulties if they have opted for international procedures to be compensated, for example, because of the long period of time required for international cases. Therefore it is preferable not to resort to State liability to compensate victims of environmental damage, as long as they can be compensated via civil procedures against the operator.

Finally, another point of view argues for the residual liability of the State after exhausting the compensation under the civil liability conventions, i.e., the liability of the operator and the additional amount of compensation provided by the State.[82] The State only bears residual liability, while the primary liability must be assigned to the operator.[83] If the primary liability of the op-

[82] Blay and Green, Vol. 25, No. 1 and 2, 1995, at pp. 30-31; See notes by Brazil, UN Doc. A/C.6/46/SR.32, p. 10, para. 35; Bulgaria, UN Doc. A/C.6/45/SR.38, p. 6, para. 22; China, UN Doc. A/C.6/45/SR.30, p. 14, para. 59; Cyprus, UN Doc. A/C.6/46/SR.23, p. 17, para. 81; India, UN Doc. A/C.6/48/SR.23, p. 12, para. 52; Iran, UN Doc. A/C.6/46/SR.32, p. 22, paras. 87-88; Italy, UN. Doc. A/C.6/44/SR.32, p.15, para. 77; Morocco, UN Doc. A/C.6.46/SR.37, p. 2, para. 6; The Netherlands, UN Doc. A/C.6/46/SR.33, p. 10, para. 40; Switzerland, UN Doc. A/C.6/47/SR.28, p. 8, para. 31; Uruguay, UN Doc. A/C.6/46/SR.35, p. 8, para. 28; Yugoslavia, UN Doc. A/C.6/45/SR.30, p. 23, para. 102; Frances stated that 'with regard to liability, the State should… have only residual liability', YILC, 1991, Vol. I, p. 102, para. 10; Njenga: 'The draft should assign civil liability to operators and residual liability to States, either where the operator could not be identified or where compensation was not adequate'. YILC 1991, Vol. I, p.111, para. 26; Pellet: '[T]he principle of the primary liability of the operator, regardless of the definition of that term, should be stated very strongly. The liability of the State could only be residual'. YILC, 1991, Vol. I, p. 107, para. 41. Also it was stated that the operator should be held primarily liable, while the State of origin should bear subsidiary liability. France, UN Doc. A/C.6/45/SR.30, p. 7, para. 25; Spain, UN Doc. A/C.6/45/SR.38, p. 12, para. 43; Austria, UN Doc. A/C.6/46/SR.33, p. 2, paras. 4-5; Mahiou, YILC, 1991, Vol. I, p. 99, paras. 15-18; Frances, YILC, 1991, Vol. I, p. 102, para. 10; Jacovides, YILC, 1991, Vol. I, pp. 97-98, para. 6; McCaffrey, YILC, 1991, Vol. I, p. 127, para. 7; Graefrath, YILC, 1990, Vol. I, p. 249, para. 63; Njenga, YILC 1991, Vol. I, p. 111, para. 26; Pellet, YILC, 1991, Vol. I, p. 107, para. 41; Ogiso, YILC, 1991, Vol. I, p. 115, paras. 15-16. See also, Kecskés, AJH, Vol. 49, No. 2, 2008, at p. 234.

[83] It was mentioned by the delegation of Sweden that '[…] in extremely grave situations, civil liability regimes would prove inadequate with respect to compensation of victims. Civil liability regimes were valuable complements to State liability. The Nordic countries wished to see the interrelation between State liability and civil liability regimes clarified in the text, and considered that a system should be created in which a State liability regime and a civil liability regime complemented each other. States should also be encouraged to use existing civil liability regimes. It would be advisable to introduce into

erator cannot be established, then the residual liability should be imposed upon the source State.[84] It was considered unjust that the innocent victims of a nuclear accident should have to bear their loss themselves.[85] On the other hand, it is not just either to inflict full liability for transboundary environmental damage on the State and at the same time privilege the operator who is the main beneficiary of the activity. Thus the State should only bear a limited role of liability[86] when the civil liability regime cannot be applied, for example, if the liability of the operator cannot be determined or the local remedy has been exhausted or the victims cannot access the local remedy.[87] This trend is a moderate view in order to attract the power States to admit liability by imposing the residual liability upon the Source State only where the third party liability regime cannot be applied. For example, if a nuclear accident has occurred, the Source States will not be liable for the resulting damage, unless the amount of liability under the applicable nuclear liability convention is insufficient to compensate the total damage caused by the accident.

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the text a recommendation to States to elaborate, on a domestic or international level, corresponding civil liability systems'. UN Doc. A/C.6/44/SR.31, at p. 13, para. 54.

[84] See the Seventh report on international liability for injurious consequences arising out of acts not prohibited by international law, by Mr. Julio Barboza, Special Rapporteur, YILC, 1991, Vol. II, Part One, doc. A/CN.4/437, at p. 85, paras. 50-51; P. S. Rao, "Second Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law (Prevention of Transboundary Damage from Hazardous Activities), ILC, Fifty-first session, Geneva, 3 May-23 July 1999, UN. Doc. A/CN.4/501 (5 May 1999), at p. 16, para. 54 and at p. 18, para. 58, available at: http://untreaty.un.org/ilc/documentation/english/a_cn4_501.pdf (accessed on 22.4.2012).

[85] P. S. Rao, Second Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, ILC, Fifty-sixth session, Geneva, 3 May-4 June and 5 July-6Augst 2004, UN Doc. A/CN.4/540 (15 March 2004), at p. 11, para. 28, available at: http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N04/271/28/PDF/N0427128.pdf?OpenElement (accessed on 22.4.2012).

[86] Ibid, at pp. 9-10, para. 25.

[87] Mahiou YILC, 1991, Vol. I, p. 99, para. 16. 'The equitable solution was therefore a type of joint liability…the State of origin was liable only if harm had actually occurred and the operator was assigned residual responsibility'. YILC, 1991, Vol. I, p. 99, para. 17. 'Where there was no failure by the State to respect its obligations, primary responsibility should be assigned to the operator. The State should then assigned residual responsibility, in particular in the case of partial or total insolvency on the part of the operator. In general, it was for States to take any additional measures necessary to regulate the relationship between the State and operators with respect to liability'. YILC, 1991, Vol. I, p. 99, para. 18. See also, Cyprus, UN Doc. A/C.6/46/SR.23, p.17, para. 81; Sweden, UN Doc. A/C.6/44/SR.31, p. 13, para. 53; YILC, 1991, Vol. II, Part One, p. 88, para. 60.

Unfortunately, the draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities, adopted by the ILC in 2006, are disappointing in that they do not reflect the need for the protection of victims of environmental damage. The drafters did not consider these arguments and included only, as mentioned, the principles of civil liability, similar to those adopted in the nuclear liability conventions. Furthermore, they remain residual and optional and cannot be considered as a codification of customary international law of international liability.[88] The principles are residual because they are part of the original draft articles on international liability and complementary to the draft articles on prevention of harm, and because they are not included in a convention and are considered as optional for the States, they are considered soft law. Therefore the liability of the State for environmental damage caused by hazardous activities is still subject to the rules of customary law and the general principles of international law.

Thus the primary responsibility of States lies in the areas of prevention of damage by supervising dangerous activities and by guaranteeing that adequate money is available to compensate victims under the existing liability regimes.

As indicated, under the general principles of international law, the State is liable only if it has committed a wrongful act by violating its obligations to prevent, reduce and redress environmental damage caused by hazardous activities.[89] In the event of an act or omission by the State itself or by its organs or other entities deemed to act on its behalf or failing to carry out its obligations to prevent such damage,[90] the nuclear liability conventions do not affect the rights and obligations of a contracting party under the general rules of public international law.[91] Thus a contracting State may claim compensa-

[88] Boyle, JEL, Vol. 17, No. 1, 2005, at pp. 25-26.

[89] Alexandre Kiss, "State Responsibility and Liability for Nuclear Damage", in: Stockinger, Van Dyke, Geistlinger, Fussek and Machart (eds.), 2005, at p. 61.

[90] See in general, Willisch, 1987, pp. 261-297; Hermann Mosler (ed.), "Liability of the State for Illegal Conduct of Its Organs: National Reports and Comparative Studies", international colloquium held by Max Planck Institute of Foreign and International Public Law, Heidelberg Germany, 1964, C. Heymanns Publisher, Verlag, Cologne and Berlin, 1967; Smith, 1988; Lammers, 1984, at pp. 587-661; Lucas Bergkamp, "Liability and Environment: Private and Public Law Aspects of Civil Liability for Environmental Harm in an International Context", Publisher Kluwer Law International, The Hague, 2001; Kiss and Shelton, in Ndiaye and Wolfrum (eds.), 2007, pp. 1131-1151, at p. 1140, available at: http://ssrn.comabstract=1010478 (accessed on 17 April 2009).

[91] Article XVIII of the Amended Vienna Convention; Annex II of the Paris Convention; Article XV of the Convention on Supplementary Compensation.

tion *vis-à-vis* other contracting parties.[92] The State, for instance, would be responsible under international law if it dumped radioactive waste at sea contrary to rules of international law, nuclear safety standards and the provisions of control and management of radioactive waste. The State might also be liable for the violation of its obligations established under national law, for instance, if the State did not implement the provisions of the nuclear liability conventions, enacted nuclear legislation or regulations contrary to the nuclear liability conventions, operated a nuclear installation against nuclear safety rules, tolerated the operation of a nuclear reactor without prior authorisation or ignored a prior notification or consultation with the States which are likely to be affected by damage caused by a nuclear facility. In these cases, the operator of a nuclear installation is liable for damage caused by the installation and the State is liable for other consequences arising out of the violation of the "due diligence" requirement.[93] The State is subject to liability under the general principles of international law in the event of its failure to pursue due diligence for activities conducted within its territory or under its control and to implement preventive measures.[94] It has the obligation to perform due diligence in the authorisation of the activity, in maintaining of the activity and in case of damage caused by the activity.[95] Due diligence is considered the basis of liability of the State for damage caused by nuclear facilities carried out by private persons.[96] It was argued that 'due diligence is no longer equated with fault, such that […] failure to observe due diligence will [now] amount to a violation of the substantive obligation under primary rules and hence engage responsibility regardless of fault. An

[92] Lammers, 1984, at p. 641.

[93] Report of ILC on the work of its forty-sixth session, 2 May-22 July 1994, to the General Assembly, Supplement No. 10 (A/49/10), at p. 376.

[94] Topical summary of the discussion held in the Sixth Committee of the General Assembly during its forty-eighth session prepared by the Secretariat, International Law Commission, Forty-sixth session 2 May-22 July 1994, Report of the International Law Commission on the Work of Its Forty-Fifth Session (1993), UN General Assembly Doc. A/CN.4/457, 15 February 1994, at p. 56, para. 238, available at: http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N94/028/80/PDF/N9402880.pdf?OpenElement (accessed on 24.4.2012).

[95] P. S. Rao, Third Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, ILC, Fifty-eighth session, Geneva, I May to 9 June and 3 July to 11 August 2006, UN Doc. A/CN.4/566, (6 March 2006), at p. 22, para. 31.

[96] P. S. Rao, Second Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, ILC, Fifty-sixth session, Geneva, 3 May-4 June and 5 July-6Augst 2004, UN Doc. A/CN.4/540 (15 March 2004), at p. 9, para. 25.

important consequence of this development is that it will often provide the basis of responsibility for the activity of private operators'.[97]

Imposing liability on the Source State in case it violates its obligations is justified by the fact that the State is obliged to ensure compliance with its international obligations.[98] This induces and prompts it to meet its obligations and to ensure, for instance, that the rules of nuclear safety have been applied by the operator. Negligence of the Installation State in the supervision and implementation of international safety standards by the operator of the nuclear installation increases the possibility of a nuclear accident. State liability induces it to take all preventive nuclear safety measures to avoid a nuclear accident and to establish an effective response mechanism to minimise damage caused by nuclear activities.[99] In addition, the supervision of a nuclear installation is a special matter related to the sovereignty of the State which imposes on it the responsibility of ensuring the implementation of international safety standards even if the nuclear installation is operated by a private operator.[100] Finally, it ensures that the liability of the operator and his financial obligations to compensate all the innocent victims of nuclear damage has been fulfilled.[101]

6.5 Combination and integration of State and civil liability

6.5.1 Interrelationship of the two regimes: The need for combination

In the absence of direct State liability, discussions are currently being held on the elaboration of rules governing liability for damage caused by hazardous activities composed of international and civil liability norms.[102] This

[97] Francisco Orrego Vicuña, "State Responsibility, Liability, and Remedial Measures under International Law: New Criteria for Environmental Protection", in: Weiss (ed.), 1992, pp. 124-158, at p. 152.
[98] Okowa, 2000, at p. 170.
[99] Rao, Third Report on the Legal Regime for Allocation of Loss, UN Doc. A/CN.4/566, (6 March 2006), at p. 22, para. 32.
[100] As Tomuschat stated: 'In most fields of life today, international multilateral standards had become the relevant yardstick for measuring the acceptability of a given activity that might cause harm. Nuclear power plants, for example, had to comply with the IAEA standards. If they failed to do so, a neighbouring State could rightly complain and request remedial action'. YILC, 1991, Vol. I, at p. 109, para. 12.
[101] Rüdiger Wolfrum, "Means of Ensuring Compliance with and Enforcement of International Environmental Law", in: RDC, Vol. 272, 1998, pp. 9-154, at p. 92.
[102] Kecskés, AJH, Vol. 49, No. 2, 2008, at p. 1; Birnie and Boyle, 1992, at p. 147; Lefeber, 1996, at p. 231; See, e.g., Report of the Technical Group of Experts on Liability and

should lead to a comprehensive regime of liability composed of elements of both civil and international liability.[103] It can be viewed from two perspectives: (a) civil liability to cover nuclear damage caused by a nuclear accident suffered within the country under national law;[104] and (b) international liability to cover transboundary environmental nuclear damage.[105] As points out:

> 'International State liability is an essential complementary element of any global and comprehensive nuclear compensation system. Civil liability alone will not be able to fully compensate victims of a nuclear accident and will therefore, not fully internalize the costs of nuclear activities. To make it effective and politically acceptable, State liability must be fully integrated procedurally with any civil liability system as a last tier of compensation following a simple process for handling together both civil and State liability claims at the international level, with individuals being able to sue Installation States'.[106]

The same point of view was expressed by Dupuy, who argues for the integration of the rules of liability under private and public international law in one unified liability regime.[107] The combination of these rules of liability

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Redress in the Context of the Cartagena Protocol on Biosafety, UN Doc. UNEP/CBD/BSWG-L&R/1/2-UNEP/CBD/COP-MOP/2/INF/5 (24 February 2005); Boyle, JEL, Vol. 17, No. 1, 2005, at pp. 25-26; Philippe Cullet, "Liability and Redress for Human-Induced Global Warming-Towards An International Regime", in: Symposium: Climate Change Risk, Vol. 26A/43A, (Stanford Journal of International Law, Vol. 43/A, 2007, pp. 99-121, at p. 108; Günther Handl, "Transboundary Impacts", in: Bodansky, Brunnée and Hey (eds.), 2007, at p. 546; Zemanek, 1991, at p. 196; Louise de La Fayette, "Nuclear Liability Revised", in: RECIEL, Vol. 1, 1992, at p. 451; Leslie C. Green, "State Responsibility and Civil Reparation for Environmental Damage", in: Protection of the Environmental during Armed Conflict, RI: Naval War College, Newport, 1996, pp. 416–439; Sands, 2003, at p. 870; Birnie and Boyle, 1992, at p. 147; Alfred Rest, "Ecological Damage in Public International Law: International Environmental Liability in the Drafts of the UN International Law Commission and the UN/ECE Task Force", in: EPL, Vol. 22, No. 1, 1992, pp. 31-41, at p. 38; Andronico O. Adede, "Overview of Legal and Technical Aspects of Nuclear Accident Pollution", in: Daniel Barstow Magraw (ed.), International Law and Pollution, University of Pennsylvania Press, Pennsylvania, 1991, pp. 129-149, at p. 135.

[103] YILC, 1994, Vol. II, Part Two, at p. 156; Gehring and Jachtenfuchs, EJIL, Vol. 4, Issue 1, 1993, at p. 95.

[104] Handl, 1993, at p. 504 and also Session V Discussions, at p. 559.

[105] A. I. Joirysch, "The International Liability of Governments for Nuclear Damage", in: OECD/NEA and IAEA, 1993, pp. 561-567, at p. 566.

[106] Handl, 1993, at p. 497.

[107] Dupuy, 1976, at pp. 122-128.

would create a comprehensive nuclear liability regime which complements the existing civil nuclear liability rules in the aspects which need improvement.[108]

There are certain cases that justify the integration of the norms of civil and international liability under one unified regime to govern liability for environmental damage caused by nuclear activities.[109] In these cases, the liability of the State and the liability of the operator are interrelated. However, the primary liability would be assigned to the Installation State and not to the operator. These cases apply:

(1) for inter-state claims and transboundary damage.

(2) in a case where, despite the fact that such damage is caused by a private enterprise, other States and their subjects are affected and thus the State, as an international subject, would be held liable according to the rules of international liability before international courts.

(3) Where according to the nuclear liability conventions there is an obligation upon the State to intervene to compensate nuclear damage or where an obligation under international law has been violated.[110]

(4) Where the State is not a contracting party to any nuclear liability convention and the operator cannot be held liable.[111]

(5) Where the State is subject to liability under the rules of national civil law because it acted as a private person.[112] Nuclear installations might be operated by the State as a public authority, by the private sector or by both. Liability for nuclear damage will be imposed on the State where it runs the nuclear installations as a private entity because such action is not related to the administrative sovereignty of a State. The State is held liable under the nuclear liability conventions for damage caused by nuclear installations operated under its authority.[113]

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[108] Norbert Pelzer, "Concept of Nuclear Liability Revised: A Post-Chernobyl Assessment of the Paris and the Vienna Conventions", in: Cameron, Hancher and Kühn (eds.), 1988, at p. 114.

[109] IAEA Doc. GOV/INF/509, Annex 2, para. 4; cited in Philippe Sands, "The International Law of Liability for Transboundary Nuclear Pollution: The Existing Regime, Its Deficiencies and a Framework for a New Regime", Report prepared for Greenpeace International, August 1989, p. 4, footnote 10.

[110] Article XVIII of the 1997 Vienna Convention.

[111] Dupuy, 1976, p.122.

[112] Rosas, NJIL, Vol. 60, Issue 1/2, 1991, at p. 34.

[113] Nuclear reactor installations in many States are operated under the public authority of the State, such as France, Great Britain, Italy, Switzerland and the Netherlands. In other States, nuclear installations are operated by the public authority or by private companies, such as the Federal Republic of Germany or the United States of America. See Miatello, 1987, at p. 302.

(6) Where the nuclear liability conventions oblige the operator of a nuclear installation to maintain financial security or any other guarantee to ensure the availability of the compensation amount for victims[114] and where the State could be called upon if it authorises the operation of a nuclear installation without the operator having fulfilled this obligation.

(7) Where the State is held liable according to national and international law for environmental nuclear damage: the primary liability for nuclear damage can be explicitly or implicitly established in an agreement between States on civil liability. As indicated, there are a number of bilateral treaties concluded in the area of the operation of nuclear power plants and the passage of nuclear ships through the ports of other States. Usually, these agreements impose liability for nuclear damage caused by these ships to the authorising State. Disputes which arise are settled under national law and before the national competent courts.[115] On the other hand, these agreements give the host States the right to enter into negotiations with the source State to settle the disputes which arise by diplomatic procedures under international law. Thus 'the question of liability and amount of damage shall be subject to the mutual agreement of the two Governments in accordance with the general principles of international law'.[116] Consequently, the disputes that arise from these agreements can be settled by international law or national law. The liability of the State may arise in the event that it has failed to comply with its obligations.

(8) Where the State has the right under international law to bring actions for compensation before international courts on behalf of its citizens if they have suffered nuclear damage as a result of a nuclear accident occurring in another State.[117] The nuclear liability conventions give States the right to bring an action for compensation on behalf of its citizens before national courts.[118] Although the nuclear liability conventions do not contain direct provisions concerning international liability for nuclear damage, they do

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[114] Joirysch, 1993, at p. 566.

[115] For example, Article VIII of the 1964 agreement between the United States of America and Italy concerning the use of the Italian ports by the N. S. Savannah, UNTS, Vol. 532, 1965, p. 133; Article 1 of the 1963 agreement between the Netherlands and the United States of America for liability for damage caused by the U.S. N. S. *Savannah* to the Netherlands ports, UNTS, Vol. 487, 1964, p. 113.

[116] See the Article 10 (2) of the agreement between the United States and Greece, (Exchange of Notes Constituting An Agreement Between the United States of America and Greece Relating to the Use of Greek Ports and Territorial Waters by the N.S. *Savannah*. Athens, 23 and 24 April 1962), UNTS, Vol. 459, 1963, p. 3.

[117] Dupuy, 1976, at p. 122.

[118] Article XI A of the Amended Vienna Convention; Article 13 (g) of the Amended Paris Convention.

provide for the possibility of resort to the general rules of international liability under public international law.[119] For example, under these conventions the Contracting Parties can make mutual claims under international law in the event of disputes relating to the interpretation or application of the Conventions.[120]

Nevertheless, the two liability regimes are distinct and each has its own substantive and procedural rules.[121] Claims for nuclear damage are governed by the provisions of the nuclear liability conventions which provide for civil law rules and apply within the national legal system. However, claims that fall under State liability are governed by the general rules of public international law[122] and disputes arising out of the State's liability should be brought before international courts. As such, '[m]unicipal law governs the domestic aspects of government and deals with issues between individuals, and between individuals and the administrative apparatus, while international law focuses primarily upon the international relations between States. Nevertheless, there are many instances where problems can emerge and lead to difficulties between the two systems'.[123]

Sources of liability under international law are those recognised as being provided for in Article 38 of the Statute of the International Court of Justice, i.e. international conventions, international custom, general principles of law as recognised by civilised nations, judicial decisions and 'teachings of the most highly qualified publicists'. On the other hand, treaty law, i.e., the nu-

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[119] Annex II of the 1960 Paris Convention on Nuclear Third Party Liability states that 'This Convention shall not be interpreted as depriving a Contracting Party, on whose territory damage was caused by a nuclear incident occurring on the territory of another Contracting Party, of any recourse which might be available to it under international law'.

[120] See also the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment. It was adopted on 21 June 1993 under the auspices of the Council of Europe. It covers damage caused to life, property and the environment. It aims at preventing damage caused by dangerous activities and to ensure adequate compensation and reinstatement of the impaired environment. (Article 1) However, the Convention does not apply to nuclear damage caused during the carriage of nuclear material if such damage is covered by the 1960 Paris Convention or the 1963 Vienna Convention. See Philippe Sands and Richard G. Tarasofsky and Mary Weiss (eds.), "Principles of International Environmental Law: Documents in International Environmental Law" Manchester University Press, Manchester, New York 1994, pp. 1560-1580.

[121] Kecskés, AJH, Vol. 49, No. 2, 2008, at pp. 240-243.

[122] Joirysch, 1993, pp. 561-567.

[123] Malcolm N. Shaw, "International Law", Fifth edition, Cambridge University Press, United Kingdom, 2003, at p. 121.

clear third party liability conventions, is the only basis of liability for damage under the international nuclear liability regime.

In addition, the general principles under the two liability systems are different since State liability might be based on different grounds, including wrongful acts, absolute liability, the polluter pays principle, etc. On the other hand, the liability under the nuclear liability conventions is based on absolute or strict liability of the operator.

Finally, the consequences of liability under international law are broader. There are several forms of remedy i.e. satisfaction or secession of illegal acts, restitution, restitution in kind or compensation of nuclear damage. The adoption of these legal consequences in the nuclear liability regime may help to achieve the liability objectives more effectively, namely to prevent, reduce and repair the harmful consequences caused by nuclear activities. However, the regime of State intervention under the existing nuclear third party liability regimes is mainly adopted to compensate nuclear damage caused by a nuclear incident, including providing subsidiary and supplementary compensation. The State must intervene under the nuclear liability regime to compensate nuclear damage i.e. to provide money if there is an obligation provided for under a nuclear liability convention.

This leads to the question of how to integrate the substance of civil and international liability when they have different characteristics and a different nature. One solution could the integration of principles governing liability for nuclear damage under national and international law in one international instrument. As Zemanek pointed out:

> 'The [concerns about ...] the nature of liability, apparently overlook that all liability, whether civil or State liability, is a legal tool to balance the benefits which a private party-and the national economy of the relevant State-derive from the hazardous activity. There is, therefore, no difference in the "nature" of civil or State liability, but only [... the fact that it is governed] by a different branch of the law, a difference which disappears when both are established by an international convention'.[124]

Thus the common grounds of civil and international liability may facilitate the integration of the two regimes and achieve the common liability goals.[125] For instance, the nuclear liability conventions contain a number of nuclear liability principles.[126] One of the main purposes of these principles is to unify

[124] Zemanek, 1991, at p. 196.

[125] Jan Lopuski, "International Law on Nuclear Liability-A Critical approach", in: Pelzer (ed.), 1995, pp. 107-128, at p. 118.

[126] Leigh Hancher, "Issues of non-Contractual Liability under the EURATOM Treaty", in: Schermers, Heukels and Mead, (eds.), 1988, pp. 53-74, at p. 55.

and harmonise the national liability legislation of the various States.[127] The adoption of these principles in the conventions and their implementation into national legislation contributes to the development and improvement of the relationship between rules of international and civil liability because, following the harmonisation of the legislation, these principles objectively become indirect rules of international law.[128] This also creates some flexibility between the international and civil liability rules which could help to create a comprehensive regime of liability for nuclear damage. This is particularly the fact that the origin of the two systems of liability stems from common sources of legal rules which determine the relationship between them.[129] For example, the principle of absolute liability which was adopted by international law and the nuclear liability conventions was originally derived from the national legal systems. At present, the principle of absolute liability is one of the general principles of international law recognised by the civilised nations which are considered as a source of international law according to Article 38 of the Statute of the International Court of Justice.[130] Consequently, the introduction of international principles and principles of civil liability adopted in the nuclear liability conventions as an international instrument would create a comprehensive regime of nuclear liability which applies to environmental damage inside and outside the national territory of the Installation State.

6.5.2 Introduction of international liability elements into the nuclear liability regime

After the Chernobyl accident, IAEA member States committed themselves to improve the existing regime of civil liability for nuclear damage.[131] The IAEA General Conference recognised the fact that the existing nuclear liability conventions were inadequate to cover nuclear damage caused by a major nuclear accident.[132] Shortly after the Chernobyl accident, the IAEA General Conference convened in special sessions to examine the consequences of the accident. At its first special session, the USSR submitted a '[p]rogramme for establishing an international regime for the safe develop-

[127] Graefrath, Vol. 185, Part II, at p. 108.
[128] Faure and Nollkaemper, 2007, at p. 129, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1086281
[129] Gadkowski, 1989, at p. 76.
[130] Fadel, 1976, at p. 353; Jenks, RDC, Vol. 117, Part I, 1966, at p. 178.
[131] See Sands, RECIEL, Vol. 5, Issue 3, 1996, pp. 199-204, at p. 199.
[132] See, GC (XXXII)23 September 1988, agenda item 10, OR 311, para. 15, in El Baradei, Nwogugu and Rames, Part 2, 1993, p. 1396.

ment of nuclear energy'.[133] In this session the USSR called for the establishment of an international instrument to deal with the liability of a State for nuclear damage,[134] stating:

> 'A possible multilateral international legal instrument could envisage the liability of States for international damage in terms of the transboundary effects of nuclear accidents, as well as for material, moral and political damage caused by unwarranted action taken under the pretext of protection against the consequences of nuclear accidents (the spreading of untrue information, introduction of unjustified restrictive measures, etc.)'.[135]

On 23 September 1988, the IAEA General Conference convened to consider the revision of the issues related to liability for nuclear damage. As a result, a resolution was adopted by the conference to request the IAEA Board of Governors to study all issues of nuclear liability, including the question of State liability for nuclear damage. On 23 February 1989, the IAEA established a working group to review the existing regime of nuclear liability for the purpose of reforming the liability regime. During the negotiations, it was proposed to establish an international convention on liability for nuclear damage based on the principles of liability under international law.[136] In 1990, the working group was replaced by the IAEA Standing Committee on Liability for Nuclear Damage to study the issues of international and civil

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[133] Measures to Strengthen International Co-operation in Nuclear Safety and Radiological Protection, Draft resolution recommended by the Committee of the Whole, IAEA General Conference, IAEA, General Conference, GC(SPL.I)/8, 25 September 1986, and GC(SPL.I)/15/Rev.1, 26 September 1986, first special session, 25 ILM 1389 (1986), available at: http://heinonline.org/HOL/Page?handle=hein.journals/intlm25&div=164&g_sent=1&collection=journals (accessed on 29.4.2012).

[134] IAEA, Note by Director General, "The Question of Liability for Damage Arising from a Nuclear Accident", IAEA, Board of Governors, GOV/2306, 22 May 1987, Annex 2, at p. 2, p. 6; IAEA, Note by Director General, "The Question of International Liability for Damage Arising from a Nuclear Accident", IAEA Board of Governors, IAEA Doc. Gov/INF/509, 26 January (1987), Annex, Proposal for State responsibility for nuclear accidents, the IAEA proposal; Council of Europe, European Commission Legal Co-operation (CDCJ), "Questions Relating to Public International Law", doc. (ACDCJ8811.), Strasburg, 28 March 1988, Restricted CDCJ (88) 11, at p. 8, paras. 25-28.

[135] IAEA, General Conference, GC(SPL.I)/8, 25 September 1986, first special session, at p. 6.

[136] La Fayette, NLB, No. 50, 1992, at pp. 22-32; Boulanenkov and Brands, IAEA Bulletin, No. 4, 1988, at pp. 8-9; Nathalie L. J. T. Horbach, "Lacunae of International Nuclear Liability Agreements", in: Horbach (ed.), 1999, pp. 43-85, at pp. 56-60; see also, Consultation Group, "Compensation by Way of Public Funds", Addendum to Working Document No. 5, 19th January 1989, at p. 7.

liability.[137] During the negotiations in the Standing Committee, it was proposed that all questions of nuclear liability under civil and international liability regimes be covered by one single instrument.[138] As observed by the Polish delegation in the Standing Committee during the amendments to the Vienna Convention: 'The problem of compensation for nuclear damage cannot be solved within the regime of private international law only. It seems that a system of compensation based on a combination of the private law regime supplemented by the international State liability regime applicable to transboundary nuclear damage, may provide a satisfactory solution'.[139] Furthermore, many delegations in the Standing Committee called for the integration of the rules of civil and international liability related to nuclear damage in one single instrument.[140] Accordingly, several proposals by States were submitted to the Standing Committee to create an international instrument for nuclear damage.[141] As proposed by Italy, such a convention would be based on the concept of both State liability and the concept of civil liability of the operator of a nuclear installation,[142] the operator bearing the primary liability. The Installation State has the responsibility to ensure that nuclear activities carried out within its territory or under its jurisdiction or control do not cause damage to other States or to the global commons.[143] Consequently, the Installation State has an obligation to prevent and reduce damage caused by its nuclear installations in accordance with the 1986 Conventions on Early Notification of a Nuclear Accident and on Assistance in

[137] ElBaradei, Nwogugu and Rames, 1993, Part 2, p. 1302.

[138] The IAEA General Conference, Thirty Fourth regular session, (GC(XXXIV)914), GC(XXXIV)/931/Add.1, 17 September 1990, at p. 7, para. 8. It is available at: http://www.iaea.org/About/Policy/GC/GC34/GC34Documents/English/gc34-931-add1_en.pdf (accessed on 1.6.2010).

[139] Paper submitted by the delegation of Poland during the negotiation on the 1997 Compensation Convention, on "International System of Compensation for Nuclear Damage Based on Private Law Regime Supplemented by International State Liability Regime: Basic Assumptions and Principles in Points", Eleventh report of the SCNL, at p. 92.

[140] The relationship between civil and State liability for nuclear damage was discussed in the first session of the IAEA Standing Committee for Nuclear Damage, 23-276 April 1990, SCNL/1/INF.4, 2 May 1990, pp. 15 and 17; summary of Discussions in the Informal Working Group on "The Relationship between the Civil and State Liability Regimes", Annex II, in the same report, p. 21.

[141] Handl, ELQ, Vol. 15, No. 2, 1988, at p. 231.

[142] SCNL/3/INF.2/Rev.1, Third Session, 8-12 April 1991, at p. 4 of the Proposal, Annexed to the report.

[143] SCNL/3/INF.2/Rev.1, Third Session, 8-12 April 1991, at p. 4 of the Proposal, Annexed to the report.

the Case of a Nuclear Accident or Radiological Emergency.[144] Italy based its proposal on the existing rules under the general principles of international law and international law cases.[145]

Consequently, the definition of the relationship between the two regimes became a significant issue which needed to be determined particularly with regard to the issue of procedures in order to establish a harmonised international nuclear liability regime.[146] Therefore this issue was included in the Agenda of the Standing Committee.[147] However, despite the extensive examination which had been carried out by the Committee in order to find a way of harmonising the two liability regimes, a conclusion could not be reached.[148] Therefore due to the lack of political agreement, the Committee decided to end the discussion on the issues of State liability and focused on the issues of the revision of the Vienna Convention and the adoption of the Convention on Supplementary Compensation for Nuclear Damage.[149] As Sands states, '[t]he slow progress of the Standing Committee's work reflected political and economic sensitivities, and illustrated the difficulties in developing liability rule in other areas. A number of important nuclear power States, including France, the United Kingdom and the United States, strongly opposed rules of State liability in the amendments'.[150] The Committee failed to include in the 1997 Protocol to Amend the Vienna Convention direct liability of a State for nuclear damage. Therefore, the 1997 Convention on Supplementary Compensation was adopted to supplement the liability of the operator in order to reduce gaps in the absence of inter-state liability instrument for nuclear damage.[151]

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[144] SCNL/3/INF.2/Rev.1, Third Session, 8-12 April 1991, at p. 5 of the Proposal, Annexed to the report.

[145] SCNL/3/INF.2/Rev.1, Third Session, 8-12 April 1991, at p. 5 of the Proposal, Annexed to the report.

[146] Günther Handl, Environmental Security and Global Change: The Challenge to International Law", in: Lang, Neuhold and Zemanek (eds.), 1991, pp. 59-89, at p. 67.

[147] SCNL/1/INF.4, First Session, 23-27 April 1990, at p. 15; ElBaradei, Nwogugu and Rames, Part 2, 1993, p. 1397; Gadkowski, 1989, p. 76.

[148] La Fayette, RECIEL, Vol. 1, No. 4, 1992, pp. 443-452, at pp. 450-451.

[149] SCNL/5/INF 4, Fifth Session, 30 March-3 April 1992, at p. 9, para. 12.

[150] Sands, 2003, at pp. 909-910.

[151] See ILM, Vol. XXXVI, No. 6, 1997, p. 1454. See Article IV, Convention of Supplementary Compensation.

6.5.3 Introduction of civil liability elements in the international liability regime

In contrast, there is a positive movement in terms of the integration of civil liability elements into the international liability regime to govern environmental damage caused by hazardous activities.[152] As mentioned above, the elements of civil liability have been adopted in the Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities which were adopted by the ILC in 2006 and include elements of civil liability rather than elements of international liability.

The ILC continued examining the question of liability for damage caused by lawful acts after the adoption of the Draft Articles on the Prevention of Transboundary Harm Caused by Hazardous Activities in 2001. At the beginning, the Commission debated the possibility of creating an international instrument on the liability of a State for transboundary damage. However, 'it was noted that different types of hazardous activities will require different solutions, different legal systems may require different methods, and States at different stages of economic development may find it necessary to pursue different approaches'.[153]

In his first report to the ILC in 2003 the Special Rapporteur Rao introduced the principles of civil liability into the regime of international liability. He wished to create a model of a liability and compensation mechanism according to which the operator of the activity would be liable for environmental damage caused by his activity when there is a causal link between the damage and the activity. The operator would also be obliged to maintain financial coverage for his liability. However, the role of the State would be to guarantee such liability and to provide additional compensation to victims of damage caused by a hazardous activity. This model is based on the same principles adopted in the nuclear liability conventions and other instruments related to liability for hazardous activities.[154]

In 2004, the Special Rapporteur submitted to the ILC his second report, which included recommendations to set up general principles and guidelines to deal with liability issues. The second report was not very different from the first: it emphasised the same ideas and provided explanations for the notions introduced in the first report. It also supported the idea of imposing liability for damage caused by hazardous activities on the operator of the

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[152] Verheyen, 2005, at p. 233.

[153] Michael, AJIL, Vol. 99, No. 1, 2005, at p. 213.

[154] Rao, P.S., First Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, UN Doc. A/CN.4/531 (21 May 2003), at pp. 50-52, para. 153

activity according to the "polluter pays" principle which the Rapporteur had already introduced in his first report.[155] The report also indicated that the role of the State is to exercise due diligence when supervising the activity within its territory or under its control and to establish a regulatory regime for funding.[156]

Both reports emphasised that the liability issues for damage caused by hazardous activities would be dealt with in the form of principles rather than in a separate mechanism of liability which was endorsed by the Commission.[157] The Commission adopted non-binding principles of liability for hazardous activities, which impose liability for damage caused by such activities upon the operator of the activity and oblige the Installation State to provide additional compensation and to ensure prompt and adequate compensation for victims of transboundary damage. (Principles 3 and 4) Thus the Commission failed to adopt an international binding liability instrument that introduces State liability for damage caused by hazardous activities.

The civil liability elements were also introduced in the 1997 International Law Institute's Resolution on "Responsibility and Liability under International Law for Environmental Damage". This resolution integrates the principles of State responsibility and liability on the one hand, and civil liability on the other hand, in one single instrument to apply to transboundary environmental damage.[158] According to this resolution, both the State and the operator of a hazardous activity are liable for environmental damage caused by the activity.[159] The State is also responsible for breaches of its environmental obligations according to its duty of due diligence.[160] It is also strictly liable for damage caused by hazardous activities under international law when the damage is caused by the activity alone.[161] However, the operator of the activity is strictly liable for damage caused by his activity under the civil liability regime.[162]

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[155] Rao, P.S., Second Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, International Law Commission, 56th session. Geneva, 3 May-4 June and 5 July-6 August 2004, UN Doc. A/CN.4/540 (15 March 2004), at p. 6, para. 14.

[156] Ibid, at pp. 9-10, para. 25.

[157] Matheson, AJIL, Vol. 99, No. 1, 2005, at p. 212.

[158] See also Institute of International Law, "Resolution on Responsibility and Liability under International Law for Environmental Damage", 37 I.L.M. 1474 (1998). The text is also available at: http://www.idi_iil.org/idiE/resolutionsE/1997_str_03_en.PDF (accessed on 8.4.2009).

[159] Article 1 of the Resolution.

[160] Article 3 of the Resolution.

[161] Article 4 of the Resolution.

[162] Article 5 of the Resolution.

These two instruments are the only ones in general international law composed of international and civil liability elements. However, other international instruments which cover international and civil liability elements have been created to govern liability in a specific field. For instance, the nuclear liability conventions cover only liability for nuclear damage and do not cover damage caused by other activities. In contrast, the 2006 ILC Draft principles and the 1997 International Law Institute's Resolution apply to nuclear damage as well as damage caused by other hazardous activities.

6.5.4 Procedural integration

The integration of civil and international rules governing liability for nuclear damage in an international instrument raises the question of which procedures would be followed and which law would be applied. Usually, civil liability procedures are followed in the case of civil liability claims and international procedures in the case of international claims. However, this solution leads to the result that claims for environmental damage caused by a single accident are brought before two different courts and systems. Therefore, the effective solution to this problem could be to establish an international *ad hoc* forum which has the competence to decide on civil and international claims and to give both individuals and States the right to bring their actions for compensation before this international body.[163] This was the solution that was suggested during the revision of the Vienna Convention.

6.5.4.1 International ad hoc forum

An *ad hoc* international forum (court or tribunal) for nuclear damage would facilitate resolving disputes that arise, e.g., from the interpretation or application of the nuclear liability conventions to litigation for nuclear damage. At the present time, there is a strong interest in many areas in the world in extending their existing or starting a new nuclear power programme which will not only increase the number of nuclear power plants, but will increase all the activities related to the nuclear fuel cycle. The significant increase of such activities, including transport, will obviously lead to an increased risk of transboundary environmental damage.[164] Consequently, litigation for

[163] Handl, 1993, at p. 504.

[164] Due to the rapid increase of the use of nuclear reactors, transboundary environmental damage is likely to be caused when a major nuclear accident occurs during the course of operation of nuclear reactors. These reactors also produce large volumes of spent nuclear fuel and nuclear waste during the course of operation. In addition, a large number of the operating reactors are likely to be decommissioned in the coming few decades. The dis-

transboundary environmental nuclear damage would also increase. The creation of such an international forum would have several advantages. For example, it would internationalise the procedures of claims for nuclear damage in case of transboundary consequences caused by a nuclear accident; it would simplify jurisdictional procedures concerning claims for nuclear damage where the victims of a nuclear accident are foreigners; it would reduce difficulties such as understanding the legal order of a foreign country or the translation and interpretation of the language used in that country where the victims have to bring their claims for compensation in a foreign country; and finally, it could avoid suspicion of impartiality of national courts on the part of the foreign victims. Such a forum would ensure equity for the victims of nuclear damage and remove the doubts of foreign victims with regard to biased courts.[165]

6.5.4.1.1 The European Nuclear Energy Tribunal

In 1959, the European Nuclear Energy Tribunal was established to deal with international disputes arising from the interpretation or application of the Paris Convention and the 1963 Brussels Supplementary Convention. This Tribunal was created by the Convention on the Establishment of a Security Control in the Field of Nuclear Energy and the Protocol on the Tribunal established by that Convention of 20 December 1957.[166] It is composed of seven judges appointed by the OECD Council for a five-year term. The proceedings before the Tribunal are governed by the Rules of Procedure of the European Nuclear Energy Tribunal which were adopted on 11 December 1962.[167] The applicable law before the Tribunal is the 1957 Convention, the Paris Convention and the Brussels Convention.[168] The competence of the Tribunal includes any dispute between the contracting parties arising from the interpretation or application of the Eurochemic Convention,[169] the Paris

posal of waste and wreckage resulting from the operation and decommissioning of the reactors may cause serious environmental catastrophes.

[165] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 129.

[166] The Convention was adopted on 20 December 1957 and came into force on 22 July 1959. For the text of the Convention see, http://webnet.oecd.org/oecdacts/Instruments/ShowInstrumentView.aspx?InstrumentID=198&Lang=en&Book=False (accessed on 31.3.2012).

[167] For the rules of procedure of the European Nuclear Energy Tribunal see, available at: http://www.oecd-nea.org/law/european-nuclear-tribunal-rules.pdf (accessed on 24.2.2012).

[168] http://www.nea.fr/html/law/european-nuclear-tribunal.html (accessed on 28.6.2009).

[169] Article 16 of the Convention on the Constitution of the European Company for the Chemical Processing of Irradiated Fuels (Eurochemic), signed in Paris, 20 December

Convention and the Brussels Supplementary Convention in the absence of an amicable settlement.[170] However, the Tribunal lost many of its functions after the suspension of the Security Control Regulations by the Steering Committee's Decision of 14 October 1976.[171] The Security Control Regulations were aimed at preventing the proliferation of nuclear weapons. This competence of the Tribunal was suspended in order to avoid the duplication of competence with the European Atomic Energy Community and the IAEA, since non-proliferation is dealt with by these organizations.[172] Although this Tribunal is a regional tribunal, it was used as a model for the creation of an international *ad hoc* tribunal as a judicial body for the settlement of disputes arising from transboundary nuclear damage.

6.5.4.1.2 The International Claims Tribunal

The establishment of an international tribunal for nuclear damage had been discussed in the Standing Committee during the course of the revision of the 1963 Vienna Convention. A proposal was made by the delegation of the Netherlands to establish a permanent international tribunal for the settlement of disputes arising from nuclear damage caused by nuclear accidents.[173] The draft of the amended Vienna Convention therefore included an article to amend Article XI of the Vienna Convention to establish a special tribunal for

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1957, entered into force on 27 July 1959. For the text of the convention see, AJIL, Vol. 53, No. 4, 1959, pp. 1030-1037.

[170] Article 17 of the Paris Convention.

[171] Steering Committee for Nuclear Damage, Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy, summary Record of the meeting held in Paris from 26 to 28 June 1990, NEA Document SEN/LEG(90)3, drafted 7 Sept 1990, dist 17th Sept 1990, at p. 3, para. 12. 'By virtue of a decision by the Steering Committee of the Nuclear Energy Agency of 14th October 1976, the application of the NEA Security Control Regulations (Articles 8 and 10 of the Convention) have been suspended until further notice'. http://webnet.oecd.org/oecdacts/Instruments/ShowInstrumentView.aspx?InstrumentID=198&Lang=en&Book=False (accessed on 31.3.2012); Convention on the Establishment of a Security Control in the Field of Nuclear Energy, http://iea.uoregon.edu/texts/1957-SecurityControlFieldNuclearEnergy.EN.htm; Footnote 2, http://webnet.oecd.org/oecdacts/Instruments/ShowInstrumentView.aspx?InstrumentID=198&Lang=en&Book=False; Fabrizio Nocera, "The Legal Regime of Nuclear Energy: A Comprehensive Guide to International and European Law", Intersentia, Antwerpen-Oxford, 2005, at p. 539.

[172] http://www.nea.fr/html/law/european-nuclear-tribunal.html (accessed on 28.6.2009).

[173] The idea of establishing of an international tribunal for disputes arising from nuclear activities had been proposed by Contracting States to the Vienna Convention and other nongovernmental organizations. It was suggested by the Netherlands, Turkish and other member States delegations and the Green Peace organization.

the settlement of claims arising from nuclear damage.[174] This proposal was justified by the fact that the concentration of all claims for nuclear damage caused by a nuclear accident before one tribunal was seen as the only way to achieve a uniform interpretation of the rules governing nuclear liability and an equitable distribution of the limited funds available under the convention.[175] Unfortunately, this proposal was rejected by the majority of State parties to the convention. It was considered unrealistic that the victims would bring their claims before a tribunal located several thousand miles away, and it was thought to be difficult for one tribunal to cope with a large number of claims for damage resulting from a nuclear accident. It was also stated that some countries are discouraged from joining the convention when their citizens benefit from the regime of the Convention.[176] It was considered urgent because political aspects are not sufficiently regulated in the Vienna Convention. As a result, the existing system of jurisdiction continues to establish the jurisdiction of national courts.[177]

Reference should also be made to the fact that a similar proposal was previously made for the establishment of an international environmental court to deal only with damage caused to the environment and to settle international environmental disputes.[178] Unfortunately, that proposal did not materialize.

Nevertheless, in another field of law, the International Tribunal for the Law of the Sea, which was established following the 1982 Convention on the Law of the Sea, can be mentioned as a successful example of the establishment of such an international tribunal. This Tribunal has general competence for any dispute arising from the interpretation or application of the 1982 Convention on the Law of the Sea and any international agreement related to the purposes of the convention.[179] It also has competence with regard to disputes arising from environmental damage caused to the sea as a result of the dumping of radioactive nuclear waste and nuclear accidents occurring during the transport of nuclear substances or caused by the means of trans-

[174] Proposal by the Turkish Delegation Regarding the Amendment of Claims Settlement Provisions of the 1963 Vienna Convention on Civil Liability for Nuclear Damage, SCNL/4/2, Relates to document SCNL/IWG.2/9, at p. 53, SCNL/4/INF.6, at p. 58, 12 December 1991.
[175] Sands, 2003, at p. 910.
[176] Sands, 2003, at p. 910.
[177] IAEA, INLEX, 2004, at p. 57.
[178] For the arguments about creation of a permanent international environmental court see, Romano, 2000, at pp. 125-129.
[179] Nelson, Ind.JIL, Vol. 37, No.3, 1997, at p. 391.

port.[180] An important case dealt with by the Tribunal in the field nuclear energy is the 2001 "Dispute Concerning the MOX Plant, International Movements of Radioactive Material, and the Protection of the Marine Environment of the Irish Sea" (Ireland *v* United Kingdom). In this case, as mentioned, Ireland asked the Tribunal to order provisional measures according to the UNCLOS. It requested the UK to suspend the authorisation of the MOX plant and to stop international movements of radioactive materials resulting from the operation of the MOX plant and to prevent serious harm to the marine environment of the Irish Sea.[181]

6.5.4.1.3 International Claims Commission

Similarly, a proposal was made by the delegation of Egypt during the revision of the Vienna Convention for the creation of an International Claims Commission to settle claims for compensation for nuclear damage.[182] Therefore, a new article for the establishment of an International Commission to settle the disputes arising from nuclear damage caused by nuclear accidents was included in the draft of the amended Vienna Convention. According to this proposed article, the contracting parties affected by a nuclear accident could agree, within six months from the accident's occurrence, to establish a Claims Commission. This Commission would have had exclusive jurisdiction in resolving the disputes arising from nuclear damage brought by vic-

[180] For reference to the International Tribunal for the Law of the Sea, see the following references in: Ind.JIL, Vol. 37, No. 3, 1997: Gudmundur Eiriksson, "The Role of the International Tribunal for the Law of the Sea in the Peaceful Settlement of Disputes", in: Ind. JIL, Vol. 37, No. 3, 1997, pp. 347-355; Alexander Yankov, "The International Tribunal for the Law of the Sea: Its Place within the Dispute Settlement System of the UN Law of the Sea Convention", in: Ind.JIL, Vol. 37, No .3, 1997, pp. 356-371; Budislav Vukas, "The International Tribunal for the Law of Sea: Some Features of the New International Judicial Institution", in: Ind.JIL, Vol. 37, No. 3, 1997, pp. 372-387; Tullio Treves, "The Jurisdiction of the International Tribunal For the Law of the Sea", in: Ind.JIL, Vol. 37, No. 3, 1997, pp. 396-419; Rüdiger Wolfrum, "Provisional Measures of the International Tribunal for the Law of the Sea", in: Ind.JIL, Vol. 37, No. 3, 1997, pp. 420-434; Joseph Akl, "The Sea-Bed Disputes Chamber of the International Tribunal for the Law of the Sea", in: Ind.JIL, Vol. 37, No.3, 1997, pp. 435-451; Edward A. Laing, "Automation of an International Judicial Organ: A Preliminary Analysis", in: Ind.JIL, Vol. 37, No. 3, 1997, pp. 452-465; Thomas A. Mensah, "The Place of the International Tribunal for the Law of the Sea in the International System for the Peaceful Settlement of Disputes", in: Ind.JIL, Vol. 37, No. 3, 1997, pp. 466-477.

[181] See Request for Provisional Measures, Statement of Case of Ireland, 9 November 2001, at p. 2, available at: www.itlos.org/case_documents/2001/document_en_191.doc.

[182] This proposal on settlement of claims was mainly proposed by the delegation of Egypt on 10 April 1991. Standing Committee on Liability for Nuclear Damage, Third Session, 8-12 April 1991, SCNL/3/INF.2/Rev.1, 23 April 1991.

tims of the contracting parties which had accepted the establishment of the Commission.[183] The composition of this Commission, the costs of its operation, its rules of procedure etc. would have been subject to the agreement of those contracting parties which established the Commission. It was also suggested that the procedures and rules for the functions of the Commission would be based upon those of a generally accepted law model of commercial arbitration.[184] Moreover, in order to ensure neutralities of the Commission, proposal was made to compose such Commission of two or three expert judges designated by each of the Contracting Parties affected by a nuclear accident.[185] Further, the Commission would have an optional claim settlement procedure and the competent court should be bound by the final judgement of the Commission if an action was brought before the Commission and the competent court.[186] In addition, the exclusive jurisdiction of the Commission would be extended to cover claims by any State not involved in the establishment of the Commission which declares its desire to accept the jurisdiction of the Commission and agrees to cover part of the cost of the operation of the Commission. This also includes extending the exclusive jurisdiction of the Commission to deal with claims for nuclear damage caused by nuclear accidents brought by any victim within that State.[187] Finally, the Commission would apply the Vienna Convention and the law of the national court having jurisdiction.[188] Unfortunately, for the reasons mentioned in regard to the International Claims Tribunal, this proposal was also rejected.

It appears that this Commission was intended to be similar to other *ad hoc* international claims commissions which were created under international law. Mention should be made of the 1972 Convention on International Liability for Damage Caused by Space Objects which provides for the establishment of a Claims Commission to resolve disputes arising from damage caused by space objects. According to this convention, if the disputes that arise cannot be settled by negotiation 'within one year from the date on which the claimant State notifies the launching State that it has submitted the documentation of its claim, the parties concerned shall establish a Claims

[183] The proposed article XIA (1) of the draft articles of the 1997 Convention Protocol, SCNL/ll/INF.5, at p. 25.
[184] The proposed article XIA (2), SCNL/ll/INF.5, at p. 25.
[185] Proposal by the Turkish Delegation Regarding the Amendment of Claims Settlement Provisions of 1963 Vienna Convention on Civil Liability for Nuclear Damage, SCNL/4/2, Relates to document SCNL/IWG.2/9, at p. 53.
[186] The proposed article XIA (3), SCNL/ll/INF.5, at p. 25.
[187] The proposed article XIA (4), SCNL/ll/INF.5, at p. 25.
[188] The proposed article XIA (5), SCNL/ll/INF.5, at p. 25.

Commission at the request of either party'.[189] The Claims Commission is entitled to decide on the merits of the claim and to determine the amount of compensation to victims of damage caused by space objects.[190] This Commission has exclusive jurisdiction over claims for compensation for damage caused by space objects, including environmental nuclear damage, when these objects are operated by nuclear power sources, such as nuclear isotopes or nuclear reactors. According to the 1972 Space Convention, a Claims Commission was established to settle the dispute between Canada and the former USSR for environmental damage caused by the Satellite Cosmos 954 accident of January 1978. The dispute was settled according to the 1981 Protocol, which was concluded between Canada and the USSR for the Settlement of Canada's Claim for Damages Caused by "Cosmos 954".[191] The Protocol obliged the Government of the USSR to pay the Government of Canada $CAD 3 million in a full and final settlement for all damage caused by the accident.[192]

Another example is the fund which the Commission established in the Security Council Resolution 687 on 3 April 1991. This was created to administer the fund after the war between Iraq and Kuwait. This resolution included the liability of Iraq under international law for the direct loss, environmental damage, depletion of natural resources, injury to foreign Governments, nationals and corporations suffered as a result of its unlawful invasion and occupation of Kuwait.[193]

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[189] Article XIV of the 1972 Space Convention.

[190] Article XVIII of the 1972 Space Convention.

[191] Canada-Union of Soviet Socialist Republics, Protocol on Settlement of Canada's Claim for Damages Caused by "Cosmos 954", concluded in Moscow, April 2, 1981, 20 ILM 689 (1981).

[192] Article I of the 1981 Protocol between Canada and the former USSR concerning the settlement of the Cosmos 594 disputes.

[193] Resolution 687 (1991), adopted by the Security Council at its 2981st meeting, on 3 April 1991 S/RES/687 (1991), 8 April 1991, available at: http://www.fas.org/news/un/iraq/sres/sres0687.htm (accessed on 25.4.2012). For the Resolution also see, Security Council Official Records: Forty Sixth Year, "Resolutions and Decisions of the Security Council 1991", S/INF/47, United Nations New York, 1993, pp. 11-15, at p. 14; also see Aide-Memoire, "Claims Procedures in Respect of Nuclear Accident Having Transboundary Consequences", prepared by Greenpeace International for the Fourth Session of the Standing Committee on Nuclear Liability of the International Atomic Energy Agency, 2-6 December 1991, at p. 8, available at: http://www.skeptictank.org/treasure/GP4/NUKP63.TXT (accessed on 24.4.2012); James Harrison, "Significant International Environmental Law Cases", in: JEL, (2006), 1 of 12, at p. 10, available at: http://jel.oxfordjournals.org/cgi/rapidpdf/eql032v1.pdf (accessed on 29.2.2012).

6.5.4.2 Applicable law

Finally, reference should be made to the applicable law if a nuclear liability regime is established combining the rules of international and civil liability norms.[194] In that case, the rules of international liability would only apply when the regime of State intervention under the civil nuclear liability regime is exhausted and where there is still uncompensated transboundary nuclear damage caused by a nuclear accident.[195] In other words, under the nuclear liability conventions the operator's financial resources must first be exhausted up to the liability limit (if any) or the actual available limit (if liability is unlimited). Secondly, the regime of State intervention will apply, and thirdly, State liability under the general rules of international law will come into play where the additional compensation provided by State intervention under the nuclear liability conventions is inadequate to compensate all nuclear damage caused by a major nuclear accident.[196] It was also suggested that the collective contributions provided by the contracting States could be replaced by the liability of the Installation State under the general rules of public international law.[197]

The laws and procedures under the international civil liability regime are applicable where damage by a nuclear accident is caused only within the territory of a State. Civil liability, as mentioned above, is an effective means to settle disputes where there is no transboundary nuclear damage.[198] It is in the interest of the victims because it is easy and faster for them to bring their claims for compensation before a national court according to the domestic nuclear third party liability law.[199] Usually the procedures before international courts take longer and are more complicated. However, international liability is more convenient and effective for the compensation of transboundary environmental nuclear damage caused by a nuclear accident where the civil liability regime is not able to compensate all the damage suffered because in the end the State is in a better position to bear full liability for the damage. The State also has the right to make a claim against another State

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[194] Faure and Nollkaemper, 2007, at p. 138. This paper available at: http://ssrn.com/abstract=1086281 (accessed on 16.3.2009).
[195] The eleventh report of the SCNL, at p. 93.
[196] The eleventh report of the SCNL, paper submitted by the delegation of Poland on, "International system of compensation for nuclear damage based on private law regime supplemented by international State liability regime: basic assumptions and principles in points", at p. 92.
[197] The eleventh report of the SCNL, at p. 93.
[198] Pelzer, 1988, at p. 114.
[199] Pelzer, 1994, at p. 273; Boyle, JEL, Vol. 17, No. 1, 2005, at p.12.

for a violation of its obligations under international law according to State responsibility for wrongful acts.

Thus State liability under the regime of international liability should be seen as a subsidiary liability where the victims cannot be fully compensated for the damage claimed in national courts. Victims of environmental nuclear damage should request compensation for the damage suffered as a result of a nuclear accident under the regime of State intervention under the applicable nuclear liability convention before making a claim against the State for such damage under the regime of international liability. Nevertheless, the application of State liability for damage caused by activities in the territory of the State or under its jurisdiction or control does not prevent victims of a nuclear accident from choosing between national and international procedures to bring actions for compensation. They can opt to bring their claims for compensation before national courts under the rules of private law.[200]

6.6 Conclusions

The chapter reveals that when nuclear energy was first used, States rejected the possibility of intervening to compensate nuclear damage, and liability for such damage was attributed to the operator of a nuclear installation. However, at a later stage, they agreed to provide additional compensation in the case that the amount of the operator's liability was insufficient to meet the claims of victims of a nuclear accident, or the operator was unable to fulfil his financial obligations. They did not go so far as to bear full and direct liability under international law for environmental nuclear damage except in limited cases where the obligations under the nuclear liability conventions, or under the general rules of international law, had been violated. They only accepted liability for environmental damage caused by space objects under the 1972 Space Liability Convention. International liability for environmental damage caused by other nuclear activities is subject to the general rules of international law which are vague and difficult to apply to environmental nuclear damage. Therefore, there is a growing argument for the State to assume liability for environmental damage according to the rules of international law and to codify such rules in an international instrument. This view was expressed more strongly following the Chernobyl accident, which revealed that transboundary environmental damage cannot be covered by civil liability alone. The arguments remain valid, given the anticipated increase of nuclear power plants and the increase of nuclear- related activities all over the world.

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[200] Dupuy, 1976, at p. 122; Miatello, 1987, at p. 304; Lefeber, 1996, at p. 231.

This chapter shows that there is an interrelationship between the principles on which national, international civil liability and international liability rules are based on. Thus the recent doctrine is in favour of integrating the two regimes of liability in one unified regime. The advantages and risks of nuclear energy on the one hand, and the rights and obligations of States and private enterprises on the other hand, justify the liability and intervention of both private operators and the State at different levels and to a different extent, following the rules of primary, secondary and residual liability as presented in this chapter. According to this approach, the primary liability for nuclear damage is, in principle, assigned to the operator of a nuclear installation under the existing regimes of liability. There are some nuclear activities which are not covered by the civil liability regime and nevertheless entail the liability of the State, such as military installations, which are connected with sovereignty of the State. However, the secondary liability is imposed upon the State under the civil liability regime. The State is obliged to provide additional compensation in addition to the liability of the operator up to the limit provided for under the applicable nuclear civil liability regime. Finally, after exhausting the liability of the operator of a nuclear installation and the additional compensation provided by the State, the residual liability for nuclear damage and responsibility for violation of rules of international law is assigned to the State under the general rules of international law. Thus claims for compensation for environmental nuclear damage must be brought first before national courts according to the civil liability regime. The civil liability regime governs liability of individuals as private subjects, the operator and the victims, under national law and courts. However, after exhausting the civil remedy, claims can be brought before international courts according to the rules of international law, as international liability relates to the liability of a State as an international subject. The liability of the State under the general rules of international law will also be examined in the following chapters.

7 STATE RESPONSIBILITY FOR VIOLATING ENVIRONMENTAL OBLIGATIONS RELATED TO NUCLEAR ACTIVITIES

7.1 Introduction

A State's failure to fulfil its commitments under international law in relation to a nuclear activity may incur State responsibility for damage caused to other States in accordance with the general principles of international law.[1] A wrongful act committed by a State vis-à-vis another State may cause damage to that State which must be repaired under international law.[2] As the former president of the International Court of Justice, Judge Higgins, stated: 'If what is required for something to fall within the law of state responsibility is an internationally wrongful act, then what is internationally wrongful is *allowing* (even without *culpa*) *the harm to occur*. A nuclear plant is a lawful activity; but failure to meet a strict-liability or due-diligence standard of care, with resultant harm, that is the internationally wrongful act, for which state responsibility attaches'.[3]

The rules of State responsibility, as recently developed and codified by the ILC Draft Articles on State Responsibility for Wrongful Acts, embody customary international law on State responsibility for wrongful acts.[4] They constitute a general principle in international law that applies to wrongful acts of the State in general,[5] including a State's violation of international obligations in respect of organizing nuclear activities in its territory or under its jurisdiction or control.[6] The Articles apply to all violations of international

[1] Boyle, BYIL, Vol. 60, 1989, at p. 285.
[2] For reparable environmental damage see chapter 3 of the study.
[3] Higgins, 1994, p. 165.
[4] Michael Feit, "Responsibility of the State Under International Law for the Breach of Conduct Committed by a State-Owned Entity", in: BJIL; Vol. 28, No. 1, 2010, pp. 142-176, at p. 145; , "State Responsibility and Attribution", in: Peter Muchlinski, Federico Ortino and Christoph Schreuer (eds.), The Oxford Handbook of International Investment Law, Oxford: Oxford University Press, 2008, pp. 549-583, p. 553.
[5] Crawford, 2002, at p. 76.
[6] Kiss, DJILP, Vol. 35, No. 1, 2006, pp. 67-83; see in general, Malgosia Fitzmaurice and Dan Sarooshi (eds.), "Issues of State Responsibility before International Judicial Institutions", Hart Publishing, Oxford and Portland Oregon, England, 2004; Donald K. Anton, Jonathan I. Charney, Philippe Sands, Thomas J. Schoenbaum and Michael J. Young,

obligations because no other regime has been developed for State responsibility, even in relation to environmental issues.[7] Imposing responsibility on the State for a breach of its environmental obligations induces it to exercise greater control over hazardous activities to prevent damage and comply with the existing international standards and conduct of international law.[8] However, the Articles do not apply to State responsibility for wrongful acts in the case of special rules of international law that exist or specific agreements to cover a specific issue,[9] such as those related to maritime environmental issues[10] or to issues of State responsibility not regulated by the Articles,[11] or in the case of other special regimes that are applicable, including those governing the responsibility of international organizations or State matters related to the conduct of an international organization,[12] or individual responsibility, such as criminal or civil liability[13] or the Charter of the United Nations.[14] In addition, the Articles are still complicated and do not define the content of international obligations because they are considered primary rules embodied in the ILC Draft Articles on prevention and international liability for acts not prohibited by international law.[15] As the Report of the International Law Commission on the Work of Its Fifty-Third Session states, '[t]he articles do

"International Environmental Law Cases, Materials, Problems", Newark: NJ, LexisNexis, Matthew Bender and Company Inc., 2007, pp. 367-508.

[7] Alan Boyle, "Reparation for Environmental Damage in International Law: Some Preliminary Problems", in: Michael Bowman and Alan Boyle (eds.), Environmental Damage in International and Comparative Law: Problems of Definition and Valuation", Oxford University Press, 2002, pp. 17-26, at p. 22.

[8] Shaw, international law, 2008, p. 785.

[9] Article 55 of the 2001 ILC Draft Articles on State Responsibility.

[10] Article 192 of the 1982 Convention on the Law of the Sea provides that "states have the obligation to protect and preserve the marine environment'. Article 194 of this Convention also provides that 'states shall take all measures necessary to ensure that activities under their jurisdiction and control are so conducted as not to cause damage by pollution to other states and their environment'.

[11] Article 56 of the 2001 ILC Draft Articles on State Responsibility.

[12] Article 57 of the 2001 ILC Draft Articles on State Responsibility.

[13] Article 58 of the 2001 ILC Draft Articles on State Responsibility. 'Article 58 makes clear that the Articles do not affect any question of the individual responsibility under international law of any person acting on behalf of a State. Although a State is responsible for a wrongful act of its officials or agents, such persons may also have individual criminal responsibility for those acts; and this is especially so for violations of the law of armed conflict and other international crimes. The Article leaves open the issue of possible individual *civil* responsibility for such crimes'. Anthony Aust, "Handbook of International Law", Cambridge University Press, 2010, p. 395.

[14] Article 59 of the 2001 ILC Draft Articles on State Responsibility.

[15] Crawford, 2002, p. 74.

not attempt to define the content of the international obligations, the breach of which gives rise to responsibility. This is the function of the primary rules, whose codification would involve restating most of substantive customary and conventional international law'.[16] This is because the function of the primary rules, as noted in the previous part of the study, is to create the rules organizing the activity, and the function of the secondary rules or State responsibility is to observe whether or not that they have been applied by the State.[17]

The chapter mainly examines the essential aspects of State responsibility for its wrongful acts and its application to environmental damage caused by nuclear activities, particularly because there are ample examples from the literature regarding State responsibility in general.[18] Furthermore, the specific aim in this chapter is to examine the issues of State responsibility for wrongful acts as a subject of international law and excludes those applying to responsibility of international organizations for wrongful acts.

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[16] The 2001 ILC Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries, p. 32, para. 1. The Articles are available at: http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_6_2001.pdf (accessed on 19.6.2010).

[17] The 2001 ILC Draft Articles on Responsibility of States, commentaries, p. 32, para. 3.

[18] See in general, Crawford, Pellet and Olleson (eds.), 2010; Thomas D. Grant, "International responsibility and the Admission of States to the United Nations", in: MJIL, Vol. 30, Issue 4, 2009, pp. 1095-1185. The article is also available at: http://students.law.umich.edu/mjil/article-pdfs/grant.pdf (accessed on 4.5.2010); Ralph P. Kröner, "Transnational Environmental Liability and Insurance", Graham & Trotman, London 1992; Kiss, DJILP, Vol. 35, No. 1, 2006, pp. 67-83; Francisco Orrego Vicuña, "Current Trends in Responsibility and Liability for Environmental Harm under International Law", in: Kalliopi Koufa (ed.), Protection of the Environment for the New Millennium, Athens, Sakkoulas Publications, 2002, pp. 127-182; David D. Caron, "The ILC Articles on State Responsibility: The Paradoxical Relationship between Form and Authority", in: AJIL, Vol. 96, 2002, pp. 857-873; Robert Rosenstock, "The ILC and State Responsibility", in: AJIL, Vol. 96, Issue 4, 2002, pp. 792-797; Per Malm, "State Responsibility in Relation to Transboundary Environmental Damage", Master Thesis, Gregor Nall, International Law, Faculty of Law University of Lunds, spring 2007, available at: http://www.essays.se/essay/066d34eee2/ (accessed on 22.2.2012); Gordon Linsly and Wolfram Tonhauser, "An Expanding International Legal Regime: Environmental Protection & Radioactive Waste Management", IAEA Bulletin, 42/3/2000, pp. 24-29, available at: http://www.docstoc.com/docs/87957688/AN-EXPANDING-INTERNATIONAL-LEGAL-REGIME (accessed on 22.2.2012); Voigt, Christina, "State Responsibility for Climate Change Damages", in: NJIL, Vol. 77, No. 1-2, 2008, pp. 1-22; Tol and Verheyend, EP, Vol. 32, 2004, pp. 1109-1130; Patrick Daillier, Mathias Forteau, Alain Pellet and Daniel Müller, Droit international public, 8e édition, L.G.D.J., lextenso editions, Paris, 2009, pp. 847-915; Jiménez de Aréchaga, "International Law in the Past Third of a Century", in: RDC, Vol. 159, Part I , 1978, pp. 1-344.

Section 2 of the chapter defines the principle of State responsibility for wrongful acts and its application in case of violations of environmental obligations. Section 3 defines the concept of an internationally wrongful act and its elements. Section 4 discusses the required conditions for State responsibility and its application for the violation of environmental obligations and other obligations related to a nuclear activity. Finally, Section 5 concludes that a State's violation of its environmental obligations under international law during a nuclear activity constitutes State responsibility.

7.2 State responsibility as a general principle and its application to environmental nuclear obligations: The ILC approach

The principle of State responsibility for wrongful acts was formulated at an early stage by the Third Committee of the 1930 Conference on Codification of International Law in Article 1 of the Articles on State responsibility adopted by the Conference. This Article provides that '[i]nternational responsibility is incurred by a State if there is any failure on the part of its organs to carry out the international obligations of the State which causes damage to the person or property of a foreigner on the territory of the State'.[19] Such definition of the principle adopted the classical view of State

[19] Text of Articles adopted in First Reading by the Third Committee of the Conference for Codification of International Law (The Hague, 1930), YILC, 1956, Vol. II, at p. 225, document A/CN.4/96, Annex 3.
Similarly, the principle of State Responsibility was embodied in other Draft Articles on State Responsibility prepared by private institutions and persons, see Draft code of international law, adopted by the Japanese branch of the International Law Association and the Kokusaiho Gakkwai (International Law Association of Japan) in 1926 on "II. Rules Concerning the Responsibility of a State in Relation to the Life, Person and Property of Aliens". Article 1 provides that '[a] State is responsible for injuries suffered by aliens within its territories, in life, person or property through wilful act, default or negligence of the official authorities in the discharge of their official functions, if such act, default or negligence constitutes a violation of international duty resting upon the State to which the said authorities belong'. YILC, 1969, Vol. II, p. 141, document A/CN.4/217 and Add.1, Annex II;
Draft treaty concerning the responsibility of a State for internationally illegal acts, prepared by Professor Strupp in 1927. Article 1 states that '[a] State is responsible to other States for the acts of persons or groups whom it employs for the accomplishment of its purposes (its "organs"), in so far as these acts conflict with the duties which arise out of the State's international legal relations with the injured State. If the act consists of an omission, the employing State is responsible only if it is chargeable with fault'. YILC, 1969, Vol. II, p. 151, document A/CN.4/217 and Add. 1, Annex IX;

Article I of the Draft on "International Responsibility of States for Injuries on Their Territory to the Person or Property of Foreigners", Draft prepared by the Institute of International Law (1927), states that '[t]he State is responsible for injuries caused to foreigners by any action or omission contrary to its international obligations, whatever be the authority of the State whence it proceeds: constitutional, legislative, governmental, administrative, or judicial'. See YILC, 1956, Vol. II, at pp. 227-228, document A/CN.4/96, Annex 8; Article 1 of the Draft Convention on "Responsibility of States for Damage Done in Their Territory to the Person or Property of Foreigners, Prepared by Harvard Law School (1929) provides that [a] State is responsible, as the term is used in this convention, when it has a duty to make reparation to another state for the injury sustained by the latter state as a consequence of an injury to its national'. See YILC, 1956, Vol. II, p. 229, document A/CN.4/96, Annex 9;

Draft convention on the responsibility of States for injuries caused in their territory to the person or property of aliens, prepared by the Deutsche Gesellschaft für Völkerrecht (German International Law Association) in 1930. Article 1(1) of this draft convention states that '[e]very State is responsible to other States for injury caused in its territory to the person or property of aliens as a consequence of the violation by that State of any of its obligations towards the other State under international law'. YILC, 1969, Vol. II, p. 149, document A/CN.4/217 and Add. 1, Annex VIII;

Draft convention on the responsibility of States for international wrongful acts, prepared by Professor Roth in 1932. Article 1 of this draft states that '[a] State is responsible for the acts contrary to international law of any individuals whom or corporations which it entrusts with the performance of public functions, provided that such acts are within the general scope of their jurisdiction'. YILC, 1969, Vol. II, p. 152, document A/CN.4/217 and Add. 1, Annex X;

"Draft convention on the international responsibility of States for injuries to aliens", prepared by the Harvard Law School, 1961. Article 1 (1) (Basic principles of State Responsibility) states that '[a] State is internationally responsible for an act or omission which, under international law, is wrongful, is attributable to that State, and causes an injury to an alien. A State which is responsible for such an act or omission has a duty to make reparation therefore to the injured alien or an alien claiming through him, or to the State entitled to present a claim on behalf of the individual claimant'. YILC, 1969, Vol. II, p. 142, document A/CN.4/217 and Add.1, Annex VII;

Principles of international law that govern the responsibility of the State in the opinion of Latin American countries, prepared by the Inter-American Juridical Committee in 1962. Article I states that '[i]ntervention in the internal or external affairs of a State is not admissible to enforce the responsibility of said State. On the contrary, intervention establishes the responsibility of the intervening State'. YILC, 1969, Vol. II, p. 153, document A/CN.4/217 and Add.1, Annex XIV;

Principles of international law that govern the responsibility of the State in the opinion of the United States of America, prepared by the Inter-American Juridical Committee in 1965. Article I (General standard of responsibility) states that '[w]hen a State admits foreigners to its territory, it has an international duty to protect their life and property according to a minimum standard of rights determined by international law. Neither the receiving State nor the foreigner's State can by its own law determine this international standard. It is determined by international law. A State that fails to comply with the ap-

responsibility in which the liability is based on three elements: conduct, damage and causal link between the committed act and the damage.[20] This comprehensive definition includes the subjective and objective elements of international law liability. The comprehensive character of this definition possibly resulted from its adoption before the principle of international liability was divided into two, i.e., State responsibility for wrongful acts and international liability for lawful activities not prohibited by international law. Therefore, it was necessary to combine the elements of the two aspects of international liability in one definition.

The principle of State responsibility was affirmed and developed in international case law.[21] The Phosphates in Morocco case was one of the earliest cases in international law in which the Permanent Court of International Justice formulated the principle of State responsibility for wrongful acts. It stated that: '[I]t is in this decision that we should look for the violation of international law – a definitive act which would, by itself, directly involve international responsibility. This act being attributable to the State and described as contrary to the treaty right of another State, international responsibility would be established immediately as between the two States'.[22] There are also some judgments in environmental and nuclear cases, including the Trail Smelter Arbitration between the United States and Canada in 1941,[23] the Lac Lanoux arbitration between France and Spain in 1957, [24] the Corfu Channel case (United Kingdom of Great Britain and Northern Ireland *v.* Albania) in 1949,[25] the Gabčíkovo-Nagymaros Project (Hungary/Slovakia)

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plicable international law, as regards the person or property of foreigners in its territory, incurs international responsibility and must make reparation in such form as may be appropriate'. YILC, 1969, Vol. II, p. 153, document A/CN.4/217 and Add. 1, Annex XV; Article 1 of the Institute of International Law Draft Articles on "Responsibility and Liability under International Law for Environmental Damage" Session of Strasbourg – 1997.

[20] Brigitte Stern, "The Elements of an internationally Wrongful Act", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 193-220, at p. 194.

[21] YILC, 1971, Vol. II, Part One, at p. 205, para. 30.

[22] PCIJ, Series A/B, No. 74, 1938,, at p. 28.

[23] UNRIAA, Vol. III, p. 1905, at p. 1965; AJIL, Vol. 35, 1941, at p. 716. For the Trail Smelter case, see Günther Handl, "Trail Smelter in Contemporary International Environmental Law: Its Relevance in the Nuclear Energy Context", in: Bratspies, Miller (eds.), 2006, pp.125-139; Mark A. Drumbl, "Trail Smelter and the International Law Commission's Work on State Responsibility for Internationally Wrongful Acts and State Liability", in: Bratspies and Miller (eds.), 2006, pp. 85-98; Neil Craik, "Transboundary Pollution, Unilateralism, and the Limits of Extraterritorial Jurisdiction: The Second Trail Smelter Dispute", in: Bratspies and Miller (eds.), 2006, pp. 109-121.

[24] ILR, 1957, at pp. 123-124, para. 6.

[25] ICJ Reports, 1949, p. 22; Brownlie, 1983, at p. 43.

case in 1997,[26] the MOX Plant case (Ireland v. United Kingdom), in 2001,[27] and the Pulp Mills Case (Argentina v. Uruguay) in 2010[28] which applied the principle of State responsibility for wrongful acts, though they did not define it.

These developments of the principle of State responsibility are reflected in the current definition of the principle in the 2001 ILC Draft Articles on State responsibility for wrongful acts. The Articles consider that '[e]very internationally wrongful act of a State entails the international responsibility of that State'.[29] This provision constitutes a general principle of State responsibility that applies when a State violates the environmental rights of another State according to international law.[30] The application of the principle relies on the definition and interpretation of the concept of an interna-

[26] Reports of the ICJ, 1997, at p. 82, para. 155; Gerhard Loibl, "Environmental law and Non-Compliance Procedures: Issues of State Responsibility", in: Fitzmaurice and Sarooshi (eds.), 2004, pp.201-217, at p. 205.

[27] The International Tribunal of the Law of the Sea, the MOX Plant Case, (Ireland v. United Kingdom), Request for provisional measures, 3 December 2001, para. 26 (3). The judgment is available at: http://www.itlos.org/start2_en.html

[28] Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), 20 April 2010, at p. 79, para. 282, avalaible at: http://www.icj-cij.org/docket/files/135/15877.pdf (accessed on 30.11.2011).

[29] Article 1 of the ILC Draft Articles on State Responsibility.

[30] Tol and Verheyend, EP, Vol. 32, 2004, pp. 1109–1130, at p. 1113, available also at: http://www.fnu.zmaw.de/fileadmin/fnu-files/publication/tol/enpolliability.pdf (accessed on 15.4.2010). The general rules of State Responsibility as adopted by the ILC 2001 Draft Articles on State Responsibility apply in the case of the violation of the State to environmental and nuclear obligations and nuclear damage caused as a result of the violation. These Articles codified the general rules of State Responsibility for wrongful acts under the general rules of international law. This is because, as mentioned above, there is no regime on State Responsibility included these rules. Indeed, there are several international environmental and nuclear conventions which generate State responsibility. However, these conventions do not determine the content and elements of State responsibility for wrongful acts. They are considered primary rules necessary to organize a nuclear activity and their violation needs the application of secondary rules of State responsibility as codified by the ILC Articles. The latter indicate, for instance, the conditions of State responsibility and under which system a wrongful act can be described, under national law or international law, considering a wrongful act a serious breach of an international obligation or international crime, which acts of an organ of the State can be attributable to the State, etc. These rules are not provided for under the environmental and nuclear liability conventions. Therefore, the Court has to apply the general rules of international law and see whether any convention or international custom or a general principle of international law or judicial decision or any other source refers to these issues. The ILC codified the general rules on State responsibility in order to be clear about their application in practice.

tionally wrongful act and international responsibility. This is particularly because the principle does not include any other necessary elements to constitute State responsibility such as fault, damage or consequences of responsibility.

Accordingly, invoking State responsibility with regard to this principle requires determining what is considered a wrongful act and attributing that act to the State. The definition of the concept of wrongful conduct and its attribution to the State are two essential elements to determine State responsibility for wrongful acts, violations of its environmental obligations while conducting nuclear activities. The wrongful act, in the case of a violation of environmental obligations, is defined under the general rules of international law. This is because environmental and nuclear agreements do not define the wrongful act. Thus the internationally wrongful act is a source of international liability. This is because international liability can be established on the basis of wrongful act liability or on the basis of any other liability such as fault liability and absolute liability. It was stated that 'for the definition of the principle stated in article 1 of the present draft, a formulation which, while indicating that the internationally wrongful act is a source of international responsibility, does not lend itself to an interpretation that might automatically exclude the existence of another possible source of "responsibility".'[31] Consequently, the principle of State responsibility is interrelated with other fundamental principles of international law which are considered a source of State responsibility, including the principle of State sovereignty, good neighbourliness and the principle of prevention. The basic duty of State responsibility, according to these principles, imposes an obligation upon the State not to act in conflict with the rights of other States. It imposes State responsibility upon the Installation State not to cause environmental damage to the neighbouring State, or to other States or to the global environment, when it conducts nuclear activities or any other hazardous activities within its territory or under its jurisdiction or control. A breach of this principle constitutes State responsibility.

If a wrongful act is committed, this creates a new legal relationship in international law between the offending State and the injured State.[32] This new legal relationship constitutes the content of international responsibility 'by reason of the internationally wrongful act of a State'.[33] The establish-

[31] YILC, 1974, Vol. II, Part One, at p. 273, para. 110.

[32] YILC, 1971, Vol. II, Part One, at p. 206, para. 32 and at p. 210, para. 40.

[33] Commentaries to the ILC draft articles on "Responsibility of States for internationally wrongful acts" adopted by the International Law Commission at its fifty-third session (2001), (extract from the Report of the International Law Commission on the work of its Fifty-third session, *Official Records of the General Assembly, Fifty-sixth session, Sup-*

ment of international responsibility also establishes mutual rights and duties in international relations between States, viz. it imposes a duty upon offending State which caused the damage, and on the other hand, it gives a right to the injured State and vice versa. The right of one State creates a duty for the other State. Accordingly, the Installation State of a nuclear activity has the obligation to repair legal and material damage caused as a result of its violation of environmental and nuclear obligations to the injured State, and the latter has the right to the claim reparation of the damage.

The nature of this new relationship was discussed by the ILC during the codification of the principle of State responsibility. As expected, there were some differences of opinion between the members of the Commission in determining the nature of this new relationship. Some considered that the new legal relationship creates an obligation for the State to make reparation for the harmful consequences arising from a wrongful act of a State.[34] Thus, this view considers State responsibility as a reparative function of responsibility, as in the classical view of international liability that obliges the State only to repair the damage resulting from its wrongful act. Others considered it as a sanction on the State.[35] This view is consistent with the preventive function of State responsibility that is aimed at preventing and minimizing the harmful consequences of a nuclear accident. Other moderate views adopted by the ILC combined both opinions, considered that the new relationship involved the legal consequences of State responsibility for wrongful acts, i.e., the cessation of the wrongful act, and the reparation of damage. From this point of view, sanctions consist of taking measures to impose penalties, whereas reparative measures compel the offending State to redress the consequences of its wrongful act.[36] This view is consistent with the modern view of State re-

plement No. 10 (A/56/10), chp.IV.E.2), at p. 63. The Commentaries are also available at: http://www.ilsa.org/jessup/jessup06/basicmats2/DASRcomm.pdf (accessed on 11.5.2010) (hereinafter the 2001 Commentaries on State Responsibility).

[34] YILC, 1971, Vol. II, Part One, at pp. 206-207, paras. 33-34.

[35] It was stated that: 'Starting from the idea that the legal order is a coercive order, this view sees in an act of coercion not only the sole possible form of sanction, but also the sole legal consequence following directly from the wrongful act. The obligation to make reparation is – and this, according to this view, is true in any system of law – no more than a subsidiary duty placed between the wrongful act and the application of measures of coercion, by the law in municipal law, and in international law by a possible agreement between the offending State and the injured State. Accordingly, general international law would not regard the wrongful act as creating any obligatory relationship between the offending State and the injured State, but would authorize the latter to react to the wrongful act of the former by applying to it a sanction in the proper sense of the term'. YILC, 1971, Vol. II, Part One, at p. 208, para. 35.

[36] YILC, 1971, Vol. II, Part One, at p. 208, para. 36.

sponsibility that combines both the preventive and reparative functions of international liability. The State has to bear the consequences of international responsibility, i.e., to cease its illegal act and to guarantee that such an act is not repeated or to make reparation to the injured State including restitution, compensation and providing acceptable satisfaction. These consequences are addressed in Part Two of the 2001 Draft Articles on State responsibility for wrongful acts.[37] This view as adopted by the ILC supports the protection of the environment. Indeed, State responsibility as defined in contemporary international law is aimed at the prevention, mitigation and reparation of the harmful consequences arsing from hazardous activities not prohibited by international law. The combination of the cessation and non-repetition of a wrongful act, considered as a sanction and reparation of the damage in terms of correcting matters to return to the initial situation prior to the damage, means that the principle of State responsibility is more effective for the protection of the environment from damage caused by nuclear activities. For example, it obliges a State to cease the operation of a nuclear reactor installation if it violates the nuclear safety criteria, and to guarantee non-violation of such criteria in order to be allowed to operate the reactor again. The State is also obliged to compensate other States for costs of preventive measures taken to protect themselves from potential damage caused by such an unsafe nuclear installation.

Another issue relates to the applicable rules of State responsibility in this new relationship. What are the applicable rules for State responsibility? Are they the rules which apply between the offending State and the injured State, or the rules of international law in general? In other words, should a State be responsible for violating its bilateral obligations or also for violating obligations of international law in general? In our opinion, the applicable rules of State responsibility in relation to the violation of environmental obligations include not only bilateral relations between the offending State and the injured State, but also rules of international law in general. The applicability of the rules of State responsibility to environmental cases arising from a breach of environmental obligations does not rely only on the breach of international obligations between States relating to a nuclear activity, but also on the violation of the general rules of international law. This is because the Articles codified the general rules of international law on State responsibility. Treaties are not the only sources of international law and only apply to

[37] The 2001 Commentaries on State Responsibility, at pp. 211-212; Crawford, 2002, at p. 77; F. V. García Amador, Louis B. Sohn and R. R. Baxter, "Recent Codification of the Law of State Responsibility for Injuries to Aliens", Oceana Publications, INC, Dobbs Ferry, New York, A. W. Nijhoff, Leiden, 1974, at p. 11.

the States Parties. Environmental damage caused by a major nuclear accident does not only affect the neighboring States, but may also affect other States or the whole of the international community. Therefore the general rules of international law should be applied to prevent such damage. In addition, most international agreements include one or more provisions that provide for State responsibility for wrongful acts. The breach of a treaty constitutes a wrongful act and thus entails the international responsibility of the State committing the breach. As mentioned above, the principle of State responsibility has been supported by a number of international judicial decisions by international courts and tribunals. It is also supported by customary international law principles and instruments. Customary international law involves a number of fundamental international obligations that impose responsibility upon States for the protection of the environment, such as Principle 21 of the Stockholm Declaration and Principle 2 of the Rio Declaration. This was indicated by the ILC during its examination of the Articles. The 1973 Report of the ILC stated that:

> 'The Commission is proposing to codify the rules governing the responsibility of States for internationally wrongful acts *in general*, and not only in regard to particular sectors such as responsibility for acts causing injury to the person or property of aliens. The international responsibility of the State is a situation which results not just from the breach of certain specific international obligations, but from the breach of *any* international obligation, whether established by the rules governing another matter. The draft articles accordingly deal with the *general rules* which govern all the new legal relationships which may follow from an internationally wrongful act of a State, regardless of the particular sector to which the rule violated by the act may belong'.[38]

This can also be deduced from the ICJ judgement of the 1996 Advisory Opinion on the "Legality of the Threat or Use of Nuclear Weapons" when it stated that there is a general obligation in international law upon States to ensure that activities carried out within their territories or under their jurisdiction or control do not cause transboundary damage to the environment.[39] The breach of that obligation incurs State responsibility under the general rules of international law, including the rules in treaties among States. Thus the internationally wrongful act is a source of State responsibility for the violation of its environmental obligations under international law. The State is

[38] Report of the International Law Commission on the Work of Its Twenty-Fifth Session, 7 May-13 July 1973, General Assembly Official Records, Twenty-Eight Session, Supplement No. 10 (A/9010/Rev.1), at p. 8, para. 42; YILC, 1971, Vol. II, Part One, at p. 219, para. 61; YILC, 1974, Vol. II, Part One, at p. 274, para. 113.
[39] ICJ Reports, 1996, p. 226, at pp. 241-242, para. 29.

responsible for the violation of its international obligations based on any source of international law.[40]

7.3 An internationally wrongful act as a source of State responsibility for the violation of environmental and nuclear obligations

7.3.1 The definition of an internationally wrongful act

There is no specific definition in the doctrine of international law or in practice of the concept of a wrongful act, or even for the term "wrongful act".[41] Mention is only made of the elements that constitute an internationally wrongful act of a State. According to Article 2 of the 2001 ILC Draft Articles on State Responsibility, there is an internationally wrongful act when conduct consists of an action or omission that: (1) is attributable to the State under international law; and (2) constitutes a breach of an international obligation of the State.[42] These two elements are recognized by international ju-

[40] A/CN.4/246 and Add.l-3 Third report on State Responsibility, by Mr. Roberto Ago, Special Rapporteur—The internationally wrongful act of the State, source of international responsibility (YILC, 1971, Vol. II, Part One, pp. 219-220, paras. 61, 62 and 63.

[41] The term "wrongful act" has been used in different terms which differ from system to another and from one jurist to another. As the Special Rapporteur Roberto Ago mentioned in his second report on State Responsibility to the ILC, the term wrongful act is used differently in different languages: in the French system and doctrine of international law it is expressed as "fait internationalement illicite" or "délit international" or "acte illicite"; in the English system as "illegal conduct" or "delict" "tort" "delinquency" "unlawful act" or "wrongful act" or "act or omission", etc.; in the Spanish system, "delito" or "hecho internacionalmente ilícito"; and in the Italian doctrine as "delitto" or "atto illecito" or "fatto illecito". (YILC, 1970, Vol. II, at pp. 185-186, para. 26; YILC, 1971, Vol. II, Part One, at pp. 212-213, para. 45.) Nevertheless, he preferred the expression "fait internationalement illicite" as used in the French language, "wrongful act" as used in the English language, and the term "hecho internacionalmente ilícito" as used in the Spanish language. However, he did not mention to other expressions because they may have a special meaning in internal law other than wrongful act. (YILC, 1970, Vol. II, at p. 186, para. 27) Thus the term "internationally wrongful act" in the English language has been utilized by the doctrine of international law and in practice. This approach was also endorsed by James Crawford in the final draft articles on State Responsibility for wrongful acts of 2001. Crawford, 2002, at p. 80; YILC, 2001, Vol. II, Part Two, p. 34, para. 8.

[42] See also, Draft Articles on State Responsibility for wrongful acts adopted the ILC at its sessions twenty-fifth to twenty-eighth, see Report of the International Law Commission on its twenty-eighth session, YILC, 1976, Vol. II, Part Two, at p. 73; Third report on State Responsibility, by Mr. Roberto Ago, Special Rapporteur on The internationally

dicial decisions, State practice and by the doctrine of international law. In the *Phosphates Morocco* case, the PCIJ stated that if an 'act being attributable to the State and described as contrary to the treaty right of another State, international responsibility would be established immediately as between the two States'.[43] This indicates that two important terms should be defined, the term "conduct", in terms of positive and negative conduct (commission and omission) and the term "attribution", as the attribution of a conduct is only applied to human beings. This requires the link of a human conduct, positive or negative to the State.[44] This distinguishes the conduct as a source of State responsibility for a wrongful act from the conduct as a source of liability under the absolute liability of a State, as discussed above, which usually concerns a hazardous activity. However, the conduct of a State is not sufficient to incur State responsibility for a wrongful act, unless it is described as unlawful under international law. Accordingly, the State commits a wrongful act when its conduct, consisting of an act or omission, constitutes a breach of an international obligation according to the rules of international law. The wrongful act is attributed to the State when one of its representatives, i.e., the legislative, judicial, or executive power or any other agent of the State or any other person who, under the actual control of the State, has committed or omitted such conduct.[45] As Stern states: '[I]t is first necessary to ensure that an act is attributable to the State before examining whether that act is conformity with what is required from that State under international law'.[46] If the act is not attributable to the State, but is attributed to an individual, it should generate civil liability and not international responsibility. The ILC Draft Articles on State responsibility do not define when a State is in breach of international law and left this to be determined according to the primary rules and sources of international law.[47] The nuclear and environmental conventions do not define a breach of an international obligation, but they provide for the cases which constitute a beach of an international obligation.

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wrongful act of the State, source of international responsibility, Doc. A/CN.4/246 and ADD.1-3, YILC, 1971, Vol. II, Part One, pp. 199-274, at p. 214 and at p. 234.

[43] PCIJ, Phosphates in Morocco (Preliminary Objections), Judgment of June 14 1938, Series A/B, No. 74, p. 28.

[44] Willisch, 1987, at p. 32.

[45] Hashim, 1993, at p. 289.

[46] Stern, 2010, at p. 201. The ILC explained why it should investigate the subjective element before the objective one. It stated that: 'As regards the order in which these two elements appear, it seemed more logical to mention the subjective element before the objective element, because it is necessary to determine whether State conduct exists before it can be determined whether or not it constitutes a breach of an international obligation'. YILC, 1973, Vol. II, at p. 184, para. 13.

[47] Aust, 2010, at p. 379.

According to the Arbitral Award in the Dickson Car Wheel Company case:

> 'Under international law, apart from any convention, in order that a State may incur responsibility it is necessary that an unlawful international act be imputed to it, that is, that there exist[s] a violation of a duty imposed by an international juridical standard. The above cited Convention requires further the existence of damage suffered by a national of the claimant Government. It is indispensable therefore, in order that a claim may prosper before this Commission, that two elements coexist: an unlawful international act and a loss or injury suffered by a national of the claimant Government. The lack of either of these two elements must necessarily be fatal to any claim filed with this Commission'.[48]

Thus the elements of attribution and violation define the concept of State responsibility. However, two other elements need to be investigated to assign responsibility to the State: the element of damage and circumstances precluding the wrongfulness.[49] The element of damage as discussed in chapter 3 of the thesis is still controversial. The definition in the ILC Draft Articles of an internationally wrongful act does not refer to the concept of fault and damage as a condition of wrongful act liability. The doctrine of international law, as mentioned, remains divergent on these issues, which consider these elements as part of the definition of State responsibility.[50] The ILC did not address the elements of fault and damage since it views them as primary rather than secondary norms.[51] The ILC also failed to answer the question of which elements are required for State responsibility and to define whether fault and damage are elements in an internationally wrongful act or State responsibility.

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[48] RIAA, Vol. IV, at p. 678.

[49] 'The Articles do not define when a state will be in breach of international law […]. That has to be determined by applying the primary rules (the law of treaties, customary international law and other sources of international law) to the facts of each case. Whether a degree of fault, such a wilfulness or negligence, is necessary is determined in each case by those primary rules. Actual damage is not necessary unless the particular rule so provides. It is irrelevant that whether the conduct is lawful (or, for that matter, unlawful) in the responsible State's internal law. *The Articles therefore secondary rules when wrongful conduct will be attributable to a state and the legal consequences*. The Articles do not deal with the responsibility of international organizations or individuals'. Aust, 2010, at p. 379.

[50] Tanzi, 1987, at p. 3.

[51] Daniel Bodansky and John R. Crook, "Symposium: The ILC's State Responsibility Articles: Introduction and Overview", in: AJIL, Vol. 96, Issue 4, 2002, pp. 773-791, at p. 782.

7.3.2 Characterization of an internationally wrongful act

The definition of State responsibility for wrongful acts under Article 1 of the ILC Draft Articles on State responsibility raises the question of the characterization and classification of a State act as an internationally wrongful act and of whether it should be considered under the rules of national or international law. As nuclear activities are organized in accordance with norms of national and international laws, the conduct of a State when organizing such activities should be in conformity with the norms of both laws. The State conducts its activities through its representatives according to its national law, but also in accordance with the norms of international law. However, in some cases, conduct can be considered a breach under international law and not in national law, or vice versa.[52] This contradiction poses the problem of the characterization of the rules for a wrongful act and its attribution to the State. In other words, if the conduct of a State is considered to be lawful under national law, but unlawful under international law, under which type of rules should a wrongful act of a State be classified? Should the wrongful act be established according to the rules of international or national laws?

In general, a distinction is made between a State's breach of an obligation under international law and under national law. It is considered that a breach of an international obligation should be subject to the interpretation of the rules of international law and courts, while a breach of a national obligation should be subject to the interpretation of national law and courts. For instance, in commercial cases, the State is subject to national law and courts, like any private person. Despite this, there is an interrelationship between international law and national law. In commercial claims, for example, 'international law helps to determine what is the extent of the defendant State's immunity from jurisdiction and from measures of enforcement, but the underlying claim will derive from the applicable law of the contract'.[53] In contrast, 'in some cases individuals and corporations are given access to international tribunals and can bring State responsibility claims in their own right, [...] Whether such international claims could also be enforced in national courts depends on the approach of the national legal system to international law in general [...] as well as on the rules of international community'.[54]

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[52] Pierre-Marie Dupuy, "Relations between the International Law of Responsibility and Responsibility in Municipal Law", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 173-183, at p. 174.

[53] James Crawford and Simon Olleson, "The Nature and Forms of International Responsibility", in: Malcolm D. Evans, International Law, Oxford University Press, Oxford, 2010, 441-471, at p. 447.

[54] Crawford and Olleson, 2010, at pp. 447-448.

Nevertheless, an internationally wrongful act should be considered according to international law and not national law.[55] It is only considered according to the existing evidence in international law without given any consideration to wrongfulness in national law,[56] in the sense that what is considered a wrongful act in internal law does not necessarily reflect international law.[57] This was indicated in Article 3 of the Draft Articles on State responsibility which states that '[t]he characterization of an act of a State as internationally wrongful is governed by international law. Such characterization is not affected by the characterization of the same act as lawful by internal law'. This has been considered a general principle of international law under which a State cannot claim the application of the provisions of its national law or its constitution as grounds to justify its failure to fulfil its international obligations.[58] This was emphasized by the Permanent Court of International Justice in the Advisory Opinion of 4 February 4 1932 on "Treatment of Polish Nationals and Other Persons of Polish Origin or Speech in the Danzig Territory", which stated that:

> '[A]ccording to generally accepted principles, a State cannot rely, as against another State, on the provisions of the latter's constitution, but on international law and international obligations duly accepted, on the other hand and conversely, a State cannot adduce as against another State its own constitution with a view to evading obligations incumbent upon it under international law or treaties in force. Applying these principles to the present case, it results that the question of the treatment of Polish nationals or other persons of Polish origin or speech must be settled exclusively on the bases of the rules of international law and the treaty provisions in force between Poland and Danzig'.[59]

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[55] Dupuy, 2010, at p. 173. For the relevance of the rules of State responsibility in national courts see, André Nollkaemper, "International Wrongful Acts in Domestic Courts", AJIL, Vol. 101, No. 4, 2007, pp. 760-799.

[56] See Articles 27 and 46 of the Vienna Convention of the Law of Treaties. Article 27 of the Law of Treaties provides that '[a] State party to a treaty may not invoke the provisions of its internal law as justification for its failure to perform the treaty'.

[57] Feit, BJIL, Vol. 28, Issue 1, 2010, pp. 142-177, at p. 150.

[58] William W. Park and Alexander A. Yanos, "Treaty Obligations and National Law: Emerging Conflicts in International Arbitration", in: HLJ, Vol. 58, Issue 2, 2006, pp. 251-298, at p. 252; "International Law in National Courts: Discussion", in: James Crawford and Margaret Young (eds.), The Function of Law in the International Community: An Anniversary Symposium, (2008), Proceedings of the 25th Anniversary Conference of the Lauterpacht Centre for International Law, available at: http://www.lcil.cam.ac.uk/25th_anniversary/book.php. (accessed on 12.3.2011).

[59] See, Treatment of Polish Nationals and Other Persons of Polish Origin or Speech in the Danzig Territory. Advisory Opinion, February 4th 1932, PCIJ, Series A/B, No. 44, 1932, at p. 24; see also the Case of the S.S. Lotus, September 7th 1927, PCIJ, Series A,

Thus an internationally wrongful act cannot be illegal unless it is illegal under international law. The State cannot escape its responsibility for the violation of international environmental obligations with the plea that the conduct of its organ is in conformity with its national law. Despite this, international law gives the State the freedom to determine its national legal system and organs.[60] The State is considered as a legal unit and it has to accept the conduct of its organs as its own conduct. The conduct of private individuals or corporations cannot be considered as conduct of the State and cannot incur State responsibility.[61] However, this complex relationship between international law and national law may create a difficult problem where the obligations have to be established. Therefore a balance has to be struck between internal freedom of action of a State and international liability which often limits the exercise of sovereign rights of the State in order to ensure equal rights of other States.[62]

Accordingly, the rules of national law are still dominated by the rules of international law. This is because the rules of international law can be applied by national law and not vice versa.[63] In our opinion, the superiority of

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No. 10, at p. 24; In the Greco-Bugarian "Communities" case, 31 July 1930, the Court stated that 'it is a generally accepted principle of international law that in the relations between Powers who are Contracting Parties to a treaty, the provisions of municipal law cannot prevail over those of the treaty'. Interpretation of the Convention Between Greece and Bulgaria Respecting Reciprocal Emigration, Signed at Neuilly-Sur-Seine on November 27th, 1919, Advisory Opinion No. 17, July 31st 1930, PCIJ, Series B, No. 17, 1930, PCIJ, Series B, No. 17, at p. 32; Case of the Free Zones of Upper Savoy and the District of Gex (second Phase), Order of 6 December 1930, PCIJ, Series A, No. 24, 1930, at p. 12; Phosphates in Marco Case, 14 June 1938, PCIJ, Series C, No. 84, 1938, at p. 70 and at p. 712; Jurisdiction of the Danzig Courts (Actions by Certain Railway Officials Against Polish Administration), Request for Advisory Opinion, (September 24th 1927). PCIJ, Series C, No. 14-1, 1928, at p. 44 and p. 59. This also has been observed by Judge Lauterpacht in his Separate Opinion in the Case of Norwegian Loans, the International Court of Justice, Judgment of 6 July 1957, (France v. Norway). Judge Lauterpacht stated that '[n]ational legislation-including currency legislation-may be contrary, in its intention or effects, to the international obligations of the State. The question of conformity of national legislation with international law, is a matter of international law. The notion that if a matter is governed by national law it is for that reason at the same time outside the sphere of international law is both novel and, if accepted, subversive of international law. It is not enough for a State to bring a matter under the protective umbrella of its legislation, possib1y of a predatory character, in order to shelter it effectively from any control by international law'. Case of Certain Norwegian Loans, (France v. Norway), Judgment of July 6th, 1957, I.C. J. Reports 1957, p. 9, at p. 37.

[60] Graefrath, TA, Vol. XX, 1993, at p. 127.

[61] Graefrath, TA, Vol. XX, 1993, at p. 126.

[62] Graefrath, TA, Vol. XX, 1993, at p. 128.

[63] Dupuy, 2010, at p. 174.

the rules of international law over those of national law is reflected in the agreements and conventions which have been concluded and which must be applied by the States parties in their national legal system. Often provisions of an agreement that has been concluded are inserted in the national law of a State party in order to be consistent with the international obligations. Accordingly, the Installation State which carries out a nuclear activity has to enact nuclear legislation and regulations to implement its international commitments embodied in international instruments.

7.4 The required constitutive elements for State responsibility for a wrongful act related to a nuclear activity

This section concentrates on an examination of the required constitutive elements of State responsibility for an internationally wrongful act under the general rules of international law and their application to violations of an environmental obligation by the State in relation to a nuclear activity. Three conditions apply for State responsibility for wrongful acts: (1) a wrongful act committed by the State (breach of an international obligation); (2) the attribution of a wrongful act to the State; (3) no other circumstances precluding the wrongfulness can exist.[64] In the absence of any one of these conditions, the State would not be responsible for its wrongful act. The responsibility of the State has to be based on least one of the sources of international law. These elements will be examined comprehensively in three subsections. Section 7.4.1 considers the subjective element of State responsibility for an internationally wrongful act, i.e., the attribution of an international obligation to the State. Section 7.4.2 examines the objective element, i.e., the breach of an international obligation. Finally, section 7.4.3 discusses the circumstances precluding wrongfulness, i.e., exoneration from State responsibility.

7.4.1 Attribution of a wrongful act to the State for its violation of environmental and nuclear obligations: the subjective element

State responsibility is attributable only to subjects of international law, a State or an international organization.[65] Thus the State is responsible for a

[64] Crawford and Olleson, 2010, at p. 451.
[65] RIAA, Vol. IV, at p. 678.

wrongful act attributed to it when it conducts a nuclear activity.[66] According to international law, attribution of a wrongful conduct to the State is the so-called subjective element of State responsibility. The State is responsible for wrongful acts of its organs when they perform their duties, the so-called original or direct responsibility. The State may also be responsible for acts of other persons when they perform their functions if such acts have been attributed to it, the so-called indirect or vicarious responsibility. More specifically, direct responsibility is incurred by the State when a wrongful act is committed against another State by its organs. However, indirect responsibility is incurred by the State when a wrongful act is not committed by its organs but by another State or another natural person. The latter is not responsible for a wrongful act because it is not free to determine its conduct. The conduct is attributed to the State because it is free to control the act of the person committing the act.[67] As Kelsen stated, it is not a true sense of responsibility. The State is responsible for the wrongful acts of those persons because it has an obligation to repair the wrongful acts of those persons.[68]

Articles 4 to 11 of the ILC Draft Articles on State Responsibility established a general standard of attribution of an act to the State that can be applied in the case of the violation of environmental obligations. These Articles determine which conduct should be attributable to the State.[69] In

[66] 'However, the word "attribution" also covered several ideas. First, it could simply mean that an act was considered as having been committed by the State. Secondly, if it were said that the act was objectively an act of the State, it could just as objectively be considered that that act of the State constituted failure to fulfil an obligation incumbent on it and, since the necessary conditions for the existence of a wrongful act were then satisfied, the word "attribution" was used to say that an "internationally wrongful act" was attributed to the State'. YILC, 1973, Vol. I, at p. 50, para. 10.

[67] As stated, '[t]here are, however, some special cases—usually called cases of indirect responsibility, or responsibility for acts of others—which constitute an exception to the normal situation mentioned above. In these cases the responsibility arising from a particular wrongful act does not attach to the State which committed the act because it is not free to determine its conduct in the sphere in which the wrongful act was committed. The responsibility then attaches to another State, which is in a position to control the action of the first State and to restrict its freedom'. YILC, 1971, Vol. II, Part One, at p. 213, para. 47.

[68] Hans Kelsen, "Principles of International Law", Rinehart & Company, Inc. New York, 1952, reprinted by the Law book Exchange, Ltd. New Jersey, 2003, at pp. 120-121.

[69] For the doctrine of attribution in the work of the ILC see, Gordon A. Christenson, "The Doctrine of Attribution in State Responsibility", in: Richard B. Lillich (ed.), International Law of State Responsibility for Injuries to Aliens, University Press of Virginia, Charlottesville, 1983, pp. 321-360; Luigi Condorelli and Claus Kress, "The rules of At-

general, the provisions of attribution under the Articles reflect a codification of the traditional rules of attribution of acts to the State rather than any significant development of the element of attribution in the law of State responsibility.[70]

Therefore attribution of a wrongful act to the State as an element of State responsibility acquires particular importance because not all conduct is attributable to the State. At the same time the State must be responsible for all the activities under its control, irrespective of whether these activities are performed by State organs or private persons.[71] Therefore, attribution of a wrongful act to the State still gives rise to the question of whether or not the State is responsible only for its own acts or also for the acts of its subjects, groups and individuals, other States and international organizations, as well as the extent of responsibility. This is particularly important in order to determine the dividing line between acts of the State and acts of those entities. In some cases it is difficult to attribute the conduct of persons who are not organs to the State. As mentioned, nuclear activities conducted within the territory or under the jurisdiction or control of a State can be conducted by the State itself, i.e., the public authorities, or by private operators or international organizations. At the same time, the State has some duties under international law which it must observe, such as the prior authorization of a nuclear installation and taking care of nuclear safety issues.

This section discusses the attribution of a wrongful act to the State for the violation of environmental and nuclear obligations. This includes two issues: (1) the attribution of the conduct of the organs and representatives of the State (section 7.4.1.1.), i.e., acts of the officials and non-officials and exceeding their competence; and (2) the attribution of private conduct to the State (section 7.4.1.2).

7.4.1.1 Conduct of the organs, agents and representatives of a State

7.4.1.1.1 Acts of the officials

A State performs its activities through its officials, i.e., organs, agents and representatives. Under international law, the acts of the State's officials are attributed to it.[72] The ICJ stated that '[a]ccording to a well-established rule of

tribution: General Considerations", in: Crawford, Pellet and Ollenson, 2010, pp. 221-246.

[70] Bodansky and Crook, AJIL, Vol. 96, Issue 4, 2002, at pp. 782-783.

[71] Graefrath, TA, Vol. XX, 1993, at p. 128.

[72] Shaw, International Law, 2008, at p. 786. In the Advisory Opinion given by the Court on September 10th on Certain Questions relating to settlers of German origin in the territory ceded by Germany to Poland, the PCIJ stated that 'States can only act by and

international law, the conduct of any organ of a State must be regarded as an act of that State'. In the Court's view, this rule constitutes customary international law.[73]

Accordingly, the conduct of any State organ, including any person or entity with that status as determined in the internal law of the State, is considered as an act of the State according to international law. Therefore it is important to define the term 'organ of the State having the right to perform an act'. According to Ago, the term organ involved in the organization of the State is defined in general as a human being or collection of human beings.[74] It not only includes the organs of the central government and high- ranking officials and persons responsible for the external relations of the State, but also other organs of the government of any kind or classification, exercising any functions at any level in the hierarchy including, those acting at provincial and local level.[75] Thus the scope of State responsibility for acts of officials under the Articles is too broad to include acts of any legislative, executive or judicial organ or any other function, irrespective of the position it holds in the organization of the State and irrespective of its character as an organ of the central government or of a territorial unit of the State or any person with a link with these authorities.[76]

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through their agents and representatives'. Advisory Opinions, German Settlers in Poland, September 10th 1923, PCIJ, 1923, Series B, No. 6, at p. 22. According to Article 1 of the Draft Articles on State Responsibility adopted by the 1930 Hague Conference in the codification of international law, '[i]nternational responsibility is incurred by a State if there is any failure on the part of its organs to carry out the international obligations of the State which causes damage to the person or property of a foreigner on the territory of the State'. Article adopted on the first reading by the Third Commission of the Conference, YILC, 1956, Vol. II, Annex 3, at p. 225.

[73] See, Difference Relating to Immunity from Legal Process of a Special Rapporteur of the Commission on Human Rights, Advisory Opinion of 29 April 1999, ICJ Reports 1999, p. 62, at p. 87, para. 62.

[74] YILC, 1973, Vol. I, at p. 56, para. 30; YILC, 1973, Vol. II, at p. 189, para. 3. As the ILC pointed out, '[…] in theory, there is nothing to prevent international law from attaching to the State the conduct of human beings or collectivities whose link with the State might even have no relation to its organization; for example, any actions or omissions taking place in its territory could be considered acts of the State. In practice, however, we find that what is, as a general rule, attributed to the State at the international level are the acts of members of its "organization", in other words, the acts of its "organs" or "agents". This is the basic principle'. YILC, 1973, Vol. II, at p. 189, para. 3.

[75] The 2001 Draft Articles on Responsibility of States, commentaries, at p. 40, YILC, 2001, Vol. II, Part Two.

[76] Article 4 of the ILC 2001 Draft Articles on State Responsibility; Eduardo Jiménez de Aréchaga, "International Responsibility", in: Max Sørensen (ed.), Manual of public in-

However, under international law, the State is free to determine its representatives according to its national law, but ultimately acts by those persons are attributed to it.[77] This was indicated by the ILC in Article 5 of the earlier Draft Articles on State responsibility mentioned in the third report by Ago. According to this Article, 'the conduct of a person or group of persons who according to the internal legal order of a State, possess the status of organs of that State and are acting in that capacity in the case in question, is considered as an act of the State from the standpoint of international law'.[78] The acts of those persons are attributed to the State because they are expressing its will.[79] This includes acts of those persons related to a nuclear activity. However, in nuclear issues, acts performed by the organs of the State and expressing its will are issued in most cases or ordered at a high level, including the three powers of the State, i.e., the legislative, judicial and executive powers, even if these acts are implemented by local authorities. Thus standards for the attribution of an act by an organ of the State relate to the organ's performance of its functions in a manner which expresses the will of the State. Chapter 5 discussed numerous examples of conduct attributed to the State, such as enacting a regulatory regime to organize a nuclear activity or cooperation with a State affected by a nuclear accident.

7.4.1.1.2 Acts of non-officials

The general rule under international law is that acts of officials are attributable to the State. Thus acts of non-officials related to nuclear activity are not attributed to it. By way of exception, acts of non-officials are attributable to the State when they have been authorised to carry out elements of government activities which need to be carried out by them, for example, some ad-

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ternational Law, Macmillan, London, Melboune, Toronto, St. Martin's Press, 1968, at pp. 354-358; YILC, 1973, Vol. II, at p. 193; Crawford and Olleson, 2010, at p. 453.

[77] Djamchid Momtaz, "Attribution of Conduct to the State: State Organs and Entities Empowered to Exercise Elements of Governmental Authority", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 237-246, at p. 239.

[78] Third report on State Responsibility, by Mr. Roberto Ago, Special Rapporteur on the internationally wrongful act of the State, source of international responsibility, Doc. A/CN.4/246 AND ADD.1-3, YILC, 1971, Vol. II, Part One, at p. 243.

[79] In its decision on Certain German Interests in Polish Upper Silesia the Permanent Court specified that '[f]rom the standpoint of International Law and of the Court which is its organ, municipal laws are merely facts which express the will and constitute the activities of States, in the same manner as do legal decisions or administrative measures'. Case Concerning Certain German Interest in the Polish Upper Silesia, the Government of Germany v. the Government of the Polish Republic, May 25th 1926, PCIJ, Series A, No 7, 1926, PCIJ, Series A, No. 7, p. 4, 19.

ministrative works or in case the State has a duty to control their acts.[80] Thus acts of private persons performing official acts related to nuclear activities are attributable to the State where such acts are in accordance with an authorised function. The 2001 ILC Draft Articles on State Responsibility limits the attribution of acts by non-officials to the State to certain specific cases. The first includes the conduct of persons or entities authorised to carry out government activities endorsed by the law of the State and not an organ of that State as determined in Article 4 of the Articles, provided that the person or entity is acting in that capacity in that particular instance.[81] According to the commentaries, the term "entity" is a general term to reflect different bodies to include those non-organs, which are authorised by the law of the State to exercise governmental authority including, for example, private security companies.[82] Thus acts of security firms which guard a nuclear power plant, for example, are attributable to the Installation State. The scope of governmental authority concerning the attribution of the conduct of an entity to the State is not specified either and is left to be determined by each particular society according to its history and traditions.[83] Therefore, in the forefront of these difficulties, the court has to examine each case on a case-by-case basis.[84]

The second includes conduct of State organs placed at the disposal of a State by another State. According to Article 6 of the Articles, such conduct shall be attributed to the former State under international law, if that organ is acting in the exercise of elements of the governmental authority of the former State.[85] However, there are four conditions required to attribute the acts of the organ of the sending State to the receiving State. The first is that the organ should act as an organ of the receiving State rather than as an organ of the sending State. This implies that the organ should act with the consent and under the authority of the receiving State to perform functions mandated to him by the authorities of that State. Secondly, the organ should act under the regime and control or jurisdiction of the receiving State and not the sending State. If the organ's acts are under the control of its own State, such acts are

[80] Jan Arno Hessbruegge, "The Historical Development of the Doctrine of Attribution and Due Diligence in International Law", in: NYUJILP, Vol. 36, 2004, pp. 265-306, at p. 270; Shaw, International Law, 2008, at p. 786; Aust, 2010, at p. 379.
[81] Article 5 of the 2001 ILC Draft Articles on State Responsibility.
[82] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 43, para. 2.
[83] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 43, para. 6.
[84] Feit, BJIL; Vol. 28, No. 1, 2010, at p. 150.
[85] Article 6 of the 2001 Draft Articles on State Responsibility.

attributable to its State.[86] Thirdly, the organ should have the status of an organ of the sending State. Acts of experts and advisors, for instance, who have no status of the sending State are not attributable to the receiving State. Finally, the acts of the organ should be performed by the officials of the State, and private acts carried out by the organ are not attributable to the State.[87]

This Article was introduced in the Articles because it was realized that the States must share the expertise with each other and thus it should be indicated which State should be responsible for conduct of the organs performing such acts.[88] Nuclear technology is monopolized by the developed countries. The developing countries always rely on the developed countries to conduct their nuclear industry and import expertise to train personnel, particularly at the start of these activities. Furthermore, nuclear activities may be carried out in the territory of another State or in the territory of a State under trusteeship, or there may be a special relationship, e.g., in the former USSR, nuclear installations were operated in different member States.

Nevertheless, Article 6 of the Articles does not refer to the acts of the organ of an international organization placed at the disposal of a State to exercise governmental elements of the authority of that State. As stated above, 'Article 57 makes it clear that the Articles do not affect any question of the responsibility of an international organization. An international organization has international legal personality separate from its member States, and there can no longer be any doubt that the organization responsible in international law for its own acts'.[89] However, according to the commentaries, this limits the scope of the Article.[90] This provision is important in relation to the attribution of the conduct of the organs of nuclear organizations, particularly the IAEA, which provide technical and legal assistance to all the member States conducting nuclear activities. Furthermore, as mentioned above, some nuclear activities are carried out by international organizations, such as international projects and laboratories and other related nuclear activities such as the transport of nuclear substances. This raises the issue of whether the conduct of these organizations is attributable to the organization itself or to its member States, where there is a violation of environmental obligations by

[86] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 44, para. 2.
[87] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 44, para. 5.
[88] Fadel, 1976, at p. 172.
[89] Aust, 2010, at p. 394.
[90] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 45, para. 9.

the organization or damage caused by a nuclear accident as a result of such a violation. Consequently, the acts of an international organization regarding the violation of environmental obligations related to a nuclear activity carried out by it or environmental damage caused as a result of such a violation are not governed by the Articles. In addition, a general framework is being codified to govern the responsibility of international organizations for wrongful acts. Thus the conduct of an international organization is attributable to the State if there is a specific agreement in a specific sector which provides this.[91] For example, the conduct of an international organization in relation to space activities can be attributable to the State under the 1966 Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, including the Moon and Other Celestial Bodies.[92] This treaty provides for responsibility of the States Parties for national space activities carried on by governmental agencies or by non-governmental entities, including those carried out in the moon and other celestial bodies, and ensures that national activities are carried out in conformity with the provisions of the Treaty.[93] This provision imposes wrongful State responsibility for wrongful acts to protect the environment from damage caused by space activities. This provision was reflected in the Principles Relevant to the Use of Nuclear Power Sources in Outer Space.[94]

Thirdly, there is conduct directed or controlled by a State. The Installation State is responsible for wrongful acts of persons when they act under its direction or control to perform nuclear activities. According to Article 8 of the Articles, '[t]he conduct of a person or group of persons shall be considered an act of a State under international law if the person or group of per-

[91] Article 55 of the 2001 ILC Draft Articles on State Responsibility.

[92] The Treaty was adopted and opened for signature in Moscow, London and Washington, on 27 January 1967 and came into force on 10 October 1967. See UNTS, Vol. 610, p. 206. The Treaty is also in the Annex to UNGA Res. 2222 (XXI), 1499th plenary meeting, 19 December 1966.

[93] Article VI of the Outer Space Treaty.

[94] Principle 8 related to State Responsibility stated that '[i]n accordance with article VI of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, States shall bear international responsibility for national activities involving the use of nuclear power sources in outer space, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that such national activities are carried out in conformity with that Treaty and the recommendations contained in these Principles. When activities in outer space involving the use of nuclear power sources are carried on by an international organization, responsibility for compliance with the aforesaid Treaty and the recommendations contained in these Principles shall be borne both by the international organization and by the States participating in it'.

sons is in fact acting on the instructions of, or under the direction or control of, that State in carrying out the conduct'.[95] The aim of the control test is to ensure that the entity or person or group of persons are acting under the instructions of the State and its competent organs even if the status of the organ has not been recognized in national law.[96] This was also indicated by the ICJ in the Bosnia and Herzegovina v Serbia and Montenegro case. The Court stated that the 'persons, groups of persons or entities may, for purposes of international responsibility, be equated with State organs even if that status does not follow from internal law, provided that in fact the persons, groups or entities act in "complete dependence" on the State, of which they are ultimately merely the instrument'.[97] Thus the requirement of "direction or control" of a State under this Article as applied by the ICJ in *Nicaragua* and *Genocide* cases is the "effective control" test.[98] There are two situations in which it is possible to attribute the conduct of a person or group of persons in the case of wrongful acts involving violations of environmental and nuclear obligations. The first is the attribution of the conduct of private persons acting on the instructions of the State to carry out the conduct. The second is the attribution of the conduct of private persons acting under the State's direction or control. This assumes that there is a factual relationship and a real link between the person conducting the act and the regime of the State, and that effective control does exist.[99]

Fourthly, there is conduct carried out in the absence or default of the official authority. Article 9 of the ILC Articles provides that '[t]he conduct of a person or group of persons shall be considered an act of a State under international law if the person or group of persons is in fact exercising elements of the governmental authority in the absence or default of the official authorities and in circumstances such as to call for the exercise of those elements of authority'. According to this Article, there are three conditions re-

[95] Article 8 of the 2001 ILC Draft Articles on State Responsibility.

[96] Ademola Abass, "Proving State Responsibility for Genocide: The ICJ in Bosnia v. Serbia and the International Commission for Inquiry for Darfur", in: FILJ, Vol. 31, Issue 4, 2007, pp. 871-910, at p. 892.

[97] Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v Serbia and Montenegro) Merits, Judgment, 26 February 2007, at p. 140, para. 392. The Judgment available at: http://www.icj-cij.org/docket/files/91/13685.pdf (accessed on 27.2.2011).

[98] Kjetil Mujezinović Larsen, "Attribution of Conduct in Peace Operations: The 'Ultimate Authority and Control' Test", in: EJIL, Vol. 19, No. 3, 2008, pp. 509-531, at p. 514.

[99] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 47, para. 1; Bosnia and Herzegovina v Serbia and Montenegro) Merits, Judgment, 26 February 2007, at p. 143, para. 400.

quired to attribute the conduct to the State. The first is that the conduct should be effectively related to the exercise of elements of governmental authority. The second is that the conduct should be performed in the absence or default of the official authorities. The last is that the circumstances should require calling for the exercise of those elements of authority.[100] The Fukushima nuclear accident is an example which applies to nuclear issues. The Japanese authorities called national and international experts, not officials, to help to cope with the damage caused by the accident. Acts of those persons which cause environmental damage should be attributed to the State.

Fifthly, there is the conduct of an insurrectional or other movement. Attribution of acts of those movements to the State under international law in relation to the violation of environmental and nuclear obligations varies depending on the situation. In general, acts of insurrection are not attributed to the State unless it has failed to carry out due diligence to control the insurrectionists and to prevent, crush and punish them for damage caused to foreigners.[101] However, in the case of a revolution, the acts of revolutionists are attributable to the State. According to the Articles, the conduct of an insurrectional movement is in general not attributable to the State unless it is successful or covered by other provisions in chapter II of the Articles.[102] However, if the movement has succeeded in achieving its aims and becomes part of the existing government, its acts will be attributable to the State. If it has succeeded in establishing a new State on the whole territory of the existing State or on part of its territory, the previous acts of the movement and the previous acts of the government are attributable to the new State.[103] Accordingly, the new State is bound by the conduct of the previous agreements related to nuclear activities and other related acts.

Finally, there is conduct acknowledged and adopted by a State as its own conduct. This was recognized under Article 11 of the 2001 ILC Draft Articles on State Responsibility. This Article was introduced by the Special Rapporteur James Crawford. It considers conduct not attributable to a State to be attributable to it under international law if the State has acknowledged and adopted the conduct as its own. This was emphasized by the ICJ in the Tehran Case. The Court considered that the approval and welcoming attitude of the Iranian Government regarding the acts of militants and students, en-

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[100] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 49, para. 3.

[101] Robert Jennings and Arthur Watts (eds.), "Oppenheim's International Law", ninth edition, Part 1, Longman, London and New York, 1996, at p. 552.

[102] The 2001 Commentaries on State Responsibility, YILC, 2001, Vol. II, Part Two, at p. 50, para. 2.

[103] Article 10 of the 2001 ILC Draft Articles on State Responsibility.

couraging them to expand their acts to attack the US embassy as an authorization to attack the embassy and therefore considered these acts as acts of its own.[104] Accordingly, the conduct of a private operator of a nuclear installation can be attributable to the State under international law if it has accepted such conduct as its own, even if it has carried out due diligence and the conduct is not attributable to it. It appears that this Article was adopted as a compromise in order to allow, as we will see later, conduct of private persons to be attributable to the State.

7.4.1.1.3 Exceeding the competence

Another related issue is the attribution of acts of the State organ to the State when the organ has exceeded its mandate in the case of breach of international environmental and nuclear obligations. In the *LaGrand Case*, the ICJ stated that 'the international responsibility of a State is engaged by the action of the competent organs and authorities acting in that State, whatever they may be'.[105] The acts of the organ or any other entity are also attributable to the State when the organ has exceeded the competence given to it by national law or has contravened instructions related to its acts. Thus acts of the organ outside its competence are not attributable to the State. It should be remembered that all acts of the State organ were attributable to the State, including those carried out in its private capacity. The State is indirectly responsible for acts of individuals when it fails to prevent or repress the organ when it is not performing its official duty or is attempting to establish an ostensible relationship between its acts and its official duty.[106] In the *Caire case*, the French-Mexican Claims Commission did not distinguish between the responsibility of the acts of the officer outside his competence based on his function and his acts in his personal capacity. All the acts of the organ were attributable to the State. In this case, two Mexican officers killed a French citizen after they detained him in their camp because he refused to pay them money. According to the Commission's decision, '[…] the act of the officer outside his competence does not relieve the State of its international responsibility as long as the officer is authorized by his official capacity, even if the act had no connection with his official function and is in real-

[104] ICJ Reports 1980, p. 3, pp. 29-30, para. 59.
[105] LaGrand (Germany v. United States of America), Provisional Measures, Order of 3 March 1999, ICJ Reports 1999, p. 9, at para. 28.
[106] Aréchaga, RDC, Vol. 159, Part I, 1978, pp. 1-344, at pp. 277-278; J. G. Starke, "Introduction to International Law", Tenth edition, Butterworths, London, 1989, at p. 306.

ity an individual act'.[107] However, this view changed and the acts of the organ considered attributable to the State are those exercised by the organ within its competence. According to Article 46 of the 1969 Vienna Convention of the Law of Treaties, the acts of the organ which express the consent of State to be bound by a treaty are not attributable to the State if the consent was manifestly expressed by the organ in breach of national law concerning the competence of the organ. This view also was expressed by the ILC,[108] which stated that:

> 'In the opinion of the Commission such a notion is not only vague, but inaccurate. Either the organ is competent under the legal system to which it belongs, or it is not: there is no such thing as "general" or "generic" competence, as opposed to "special" or "specific" competence. And it would be even more erroneous to envisage a "general competence" attributed by international law in cases where municipal law denied its existence. A limitation thus formulated should therefore not be accepted'.[109]

This view was reflected in the 2001 ILC Draft Articles on State responsibility, which established a strict rule of responsibility to avoid escaping responsibility by arguing that the act concerned was not authorized.[110] According to the Articles, acts of a State organ or person or entity empowered to exercise elements of governmental authority are considered acts of the State if such an organ or person or entity acted in that capacity, even if it exceeded its authority or contravened instructions.[111] Accordingly, acts of State organs and other non-official persons related to nuclear activities are attributable to the State where these acts were conducted within their competence, while other acts conducted in their personal capacity are excluded.

7.4.1.2 Conduct of private operators and individuals related to a nuclear activity

It should be noted that State responsibility for wrongful acts by private persons or private conduct of its citizens or conduct of individual polluters in the case of private nuclear activities is different from the direct State responsibility for private activities carried out within its territory or under its jurisdiction or control. In the last case, the State is obliged to pursue due dili-

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[107] The original of the decision is in French and the text is translated by the author. Estate of Jean-Baptiste Caire (France) v. United Mexican States, Decision No. 33, 7 June 1929, RIAA, Vol. V, 1929, pp. 516-534, at p. 531.
[108] YILC, 1975, Vol. II, pp. 67-70, paras. 22-29.
[109] YILC, 1975, Vol. II, at p. 68, para 22.
[110] Aust, 2010, at p. 380; Shaw, international law, 2008, at p. 789.
[111] Article 7 of the 2001 Draft Articles on State Responsibility.

gence to control the activity and plays the role of the guarantor of private conduct.[112] For instance, in the case of conducting a nuclear activity or any other hazardous activity, the State has the duty to regulate and control the activity to prevent and reduce environmental damage caused by a nuclear accident.[113] The State is responsible in the case of the breach of environmental agreements and for acts of private parties if it has failed to comply with the rules of international law and fulfil its duties under the primary rules of international liability to prevent and reduce damage caused by the activities.[114] However, in the case of State responsibility for the conduct of an individual polluter or private person, the State has not breached its duty of diligence or failed to fulfil its duties to control the activity according to the rules of international law and has no duty to control the acts of the private individual. The private conduct itself is not consistent with the rules of international law. For instance, if nuclear substances have been stolen by a citizen of the State and caused environmental damage to another State, the State is not responsible for that conduct. Thus the separation of attribution of private conduct to the State from the obligation of the State to guarantee private conduct is difficult. There are some areas in international law one where there is State responsibility for guaranteeing the conduct of individuals, including those related to the environment and nuclear energy. However, '[…] at present there is no specific system for the implementation of individual responsibility under international law, except for criminal responsibility'.[115]

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[112] Birnie and Boyle, 1992, p. 140; Boyle argued that 'the problem of attributing private conduct to states will seldom impinge on responsibility for non performance of its own environmental duties. Even where an activity causing harm is privately operated, as in the Trail Smelter case, the issue remains one of the state duty of control, cooperation or notification, which cannot be avoided by surrendering the activity itself into private hands'. Boyle, BYBIL, Vol. 60, 1989, at p. 288; '[t]he tribunal, in holding Canada liable for the damage suffered by the State of Washington, did so on the grounds that Canada had permitted use of its territory by a resident in a manner which resulted in injury to the territory of another State. Whether or not Canada had attempted to prevent damage was immaterial; liability rested on the fact that Canada had permitted an abnormally dangerous activity to use its territory, and damage was sustained by another State as a result of this use. A State, in other words, acts at its peril when it permits the use of its territory by an activity which presents a substantial risk of harm to other states in the course of its operation. The State must ensure that harm does not result from the abnormally dangerous activity'. John M. Kelson, "State Responsibility and the Abnormally Dangerous Activity", HILJ, Vol. 13, No. 1, 1972, pp. 197-144, at p. 236.

[113] Lefeber, 1996, at p. 57.

[114] Bodansky and Crook, AJIL, Vol. 96, Issue 4, 2002, at p. 783; Birnie, Boyle and Redgwell, 2009, at p. 214.

[115] Christian Tomuschat, "The Responsibility of Other Entities: Private Individuals", in: Crawford, Pellet, and Olleson (eds.), 2010, pp. 317-329, at p. 317.

Therefore, responsibility for private conduct remains in the domain of national law which determines the rights and duties of individuals.[116] The dividing line in this relationship is to establish a link between private conduct and State conduct. This is an important issue in relation to determining State responsibility for the protection of the environment from hazards arsing out of the use of nuclear activities.

Three essential factors mean that the conduct of private persons must be attributed to the State in case of nuclear activities. Firstly, the conduct of a private operator may be in violation of international obligations. As mentioned above, several nuclear installations operating within the territory of a State or under its jurisdiction of control are operated by the public authorities of the State,[117] while the majority are operated by private operators. The violation of environmental and nuclear obligations by the operator may contribute to a nuclear accident and transboundary damage to the environment of other States. In the case of the Chernobyl accident, the USSR attributed the cause of the accident to the fault and negligence of the operating staff. If the Chernobyl plant had been operated by a private operator, it would have been difficult to attribute the conduct of the operator to the State, unless it had failed to pursue due diligence over the activity. It could have attributed the conduct to the State if it had failed in its due diligence and to control the activity. However, if the plant had been operated by the public authorities of the State, a connection between the conduct of the staff and the government may establish under Article 4 of the Articles.

Secondly, some of the obligations of the State related to a nuclear activity, such as environmental impact assessments or the safety of nuclear installations or regulations to organize the activities are implemented by both the State and the operator. The State is responsible for the safety of nuclear installations because it should regulate, monitor, inspect and enforce the regulations for the operation of the installation by private parties. If it fails to do so, or to do so sufficiently, and an accident occurs as a result, and damage is caused to another State, then the State is responsible under international law, even if it was the operator who violated the obligations of nuclear safety. This is because it is difficult to separate the conduct of the State and the conduct of the operator, both of which are aimed at the safe operation of the installation.

Thirdly, the attribution of private conduct to the State may apply in the case of terrorist activities.[118] Nuclear installations are susceptible to sabotage

[116] Tomuschat, 2010, at p. 317.
[117] See Miatello, 1987, at pp. 302-304.
[118] Bodansky and Crook, AJIL, Vol. 96, Issue 4, 2002, at p. 784.

by a terrorist act or nuclear material may be stolen. If such an attack has occurs it will cause an environmental catastrophe if the State has failed to ensure the safety of the installation. This necessitated the establishment of the Nuclear Terrorism Convention in 2005.[119] According to this Convention, any person who unlawfully and intentionally uses radioactive material or a device in any way or uses or damages a nuclear facility in a manner which releases or risks the release of radioactive material with the intent to cause substantial damage to property or to the environment is committing an offence.[120] Furthermore, nuclear substances can fall into the hands of terrorists or be stolen during transport if the State has failed to provide the necessary security. The Nuclear Terrorism Convention considers that any person who threatens to commit an offence with the use of nuclear material or a nuclear installation with the intent to cause damage to the environment or unlawfully and intentionally demands radioactive material, a device or a nuclear installation with threats or the use of force, is committing an offence.[121] Therefore the Convention obliges the States Parties to adopt measures in their national law to criminalize and establish appropriate penalties for such offences and to cooperate in taking practical measures to prevent such acts within and outside their territories.[122]

According to international law, in principle, the State is responsible only for acts of its organs and officials and is not responsible for acts of private persons.[123] In my opinion, there are historical reasons why States are reluctant to accept the attribution of acts of individuals to them. Before the modern State emerged, the responsibility for acts of individuals was based on collective responsibility. Acts of an individual were attributed to the group to which the individual belonged, based on the social solidarity of the group which had the duty to protect its individuals and to bear responsibility for their acts.[124] Accordingly, the whole of society or group was considered guilty of the acts of any member of the group. However, in modern society collective responsibility has been removed and replaced by the responsibility of the State and thus no longer of the social group in the society, or the State

[119] International Convention for the Suppression of Acts of Nuclear Terrorism, adopted at New York by the General Assembly of the United Nations on 13 April 2005, available at: http://treaties.un.org/doc/db/Terrorism/english-18-15.pdf (accessed on 12.4.2012).
[120] Article 2 (1) of the 2005 Nuclear Terrorism Convention.
[121] Article 2 (2) of the 2005 Nuclear Terrorism Convention.
[122] Articles 5-7 of the 2005 Nuclear Terrorism Convention.
[123] Hanqin, 2003, at p. 75. Also see Olivier De Frouville, "Attribution of Conduct to the State: Private Individuals", in: Crawford, Pellet and Olleson, 2010, pp. 257-280.
[124] Antonio Cassese, "International Law", Second Edition, Oxford University Press, New York 2005, at p. 7.

is responsible for acts of its individuals.[125] Since then, there has been a separation between the responsibility of individuals and the responsibility of a State. Thus the doctrines of international law and international case law are still cautious about this sensitive issue and about attributing all private conduct to the State. In classical society it was conceivable to attribute acts of individuals to the social group because they considered themselves as one family. However, this has become difficult in the modern State that has taken on the role of pursuing due diligence to control its subjects and maintain law and order. After the industrial revolution and the evolution of hazardous activities operated by private enterprises, particularly nuclear activities, the relationship between States and individuals became complicated and it was difficult to separate the responsibility of State from the responsibility of individuals in some cases. This is because not all the acts of a State are conducted by its officials, and some governmental activities are performed by individuals who have no official capacity.

Therefore, attributing the acts of an individual to the State became topical once again during the codification of State responsibility by the League of Nations Conference of 1930 and its preparatory work which codified the rules of international law.[126] However, the Conference failed to agree on this issue because of the disagreement on standards to govern the protection of the interests of foreigners in the territory of a State.[127] Later this topic was

[125] Eduardo Jiménez de Aréchaga, "International Responsibility", in: Max Sørensen (ed.), Manual of Public International Law, Machillan, ST Martin's Press, New York. London/Melbourne/Toronto, 1968, pp. 531-603, at p. 558.

[126] Article 10 of the "Text of Articles Adopted in First Reading by the Third Committee of the Conference for the Codification of International Law (The Hague 1930)" states that '[a]s regards damage caused to foreigners or their property by private persons, the State is only responsible where the damage sustained by the foreigners results from the fact that the State has failed to take such measures as in the circumstances should normally have been taken to prevent, redress, or inflict punishment for the acts causing the damage'. League of Nations publication, *V. Legal, 1930.V. 17* (document C.351(c)M.145(c).1930.V) cited in Document A/CN.4/96: International responsibility: report by F. V. Garcia Amador, Special Rapporteur, Annex 3, YILC, 1956, Vol. II, pp. 225-226, at p. 226; "Bases of Discussion Drawn up in 1929 by the Preparatory Committee of the Conference for the Codification of International Law (The Hague 1930) (Arranged in the Order That the Committee Considered Would be Most Convenient for Discussion at the Conference)", Basis of discussion, No.17-20, League of Nations publication, *V. Legal, 1929.V.3* (document C.75.M.69.1929.V), pp. 19-159, cited in Document A/CN.4/96: International responsibility: report by F. V. Garcia Amador, Special Rapporteur, Annex 2, YILC, 1956, Vol. II, pp. 223-225, at p. 224.

[127] Brownlie, 1983, at p. 159.

addressed by the ILC during the codification of State responsibility.[128] Nevertheless, the 2001 ILC Draft Articles on State responsibility did not include an explicate provision attributing private conduct to the State. Thus the attribution of private conduct to the State is subject to the interpretation of Articles 8 and 11, where the acts of private persons fall under these articles. However, under Article 11 'the acts of private parties are not attributable to the state unless they are attributable to it under the other articles of Chapter II'.[129] The latter are related to acts of the State under international law. Therefore, the attribution of private conduct to the State is a still a controversial issue.

Nevertheless, the doctrine of international law does not exclude the possibility of attributing private conduct to the State under international law in the light of the interpretation of the Articles.[130] Accordingly, the State may be responsible for acts of private persons, its citizens and foreigners who live in its territory under two conditions. The first is if the State has failed to exercise due diligence to control the conduct of private persons. The second is if the State has not punished those persons and forced them to pay damages for reparation of the resulting damage caused by their actions if that is possible.[131] These two conditions were affirmed by international case law. One

[128] Article 10 of the "Draft on international responsibility of the State for injuries caused in its territory to the person or property of aliens", DOCUMENT A/CN.4/111, International responsibility. Third report by F. V. Garcia Amador, Special Rapporteur, YILC, 1958, Vol. II, Annex, at p. 71.

[129] James Crawford, "Revising the Draft Articles on State Responsibility", in: EJIL, Vol. 10, No. 2, 1999, pp. 435-460, at p. 439.

[130] See Articles 8 and 11 of the 2001 Draft Articles on State Responsibility.

[131] There are some justifications by the doctrine of international law to attribute private acts to the State. It was stated that '[o]n the one hand, the state has a certain responsibility for the acts of its citizens or other persons under its control of which its agents know or ought to know and which cause harm to the legal interest of another state. On the other hand, the state has a legal interest represented by its citizens, and those harming its citizens may have to account to the state protecting the latter'. Ian Brownlie, "The Principles of Public International Law", 1990, at p. 518. Also, it was stated that 'International law imposes the duty upon every State to exercise due diligence to prevent its own subjects, and such foreign subjects as live within its territory, from committing injurious acts against other States. But, it is in practice impossible for a state to prevent all injurious acts which a private person might commit against a foreign state'. 'Beyond this a State is not responsible for acts of private persons; there is in particular no duty to do it. If, however, a State has not exercised due diligence it can be made responsible and held liable to pay damages'. Jennings and Watts (eds.), 1996, at p. 549; It was stated that '[p]urely private acts will not engage the State's responsibility, although the State may in certain circumstances be liable for its failure to prevent those acts, or take action to punish the individuals responsible'. Crawford and Olleson, 2010, at p. 453. 'Thus, for example, the

clear example is the judgment of the International Court of Justice in the Tehran Hostage Case.[132] On 4 November 1979, the United States Embassy in Tehran was attacked and occupied by Iranian militants. The United States claimed that Iran had violated its duties under the Vienna Convention on Consular Relations,[133] and the Treaty of Amity, Economic Relations, and Consular Rights between the United States of America and Iran,[134] to protect the embassy. In its Judgment of 24 May 1980, the ICJ found that the attack on the US Embassy by the militants could not be attributable to Iran, but it found it responsible for the violation of the Diplomatic and Consular Conventions for its failure to protect the Embassy.[135] Iran was also held responsible for acts of the militants because they had become its agents after the occupation of the Embassy and because of its endorsement and approval of their acts.[136] Similarly, in the Cotes Worth and Powell case of 5 November 1875, the British-Colombian Mixed Commission was established under the Convention of 14 December 1872. In its decision, the Commission stated that the State is not responsible for acts of its subjects unless it has approved

state may responsible if state law authorizes private action […] or if it fails to provide proper safeguards against private abuse of persons in need of special care. It may be responsible if it maintains in the books unenforced laws which cause apprehension […and] interference in individual lives'. James Crawford, EJIL, Vol. 10, No. 2, 1999, at p. 439. This is because '[t]he obligation to apprehend and punish wrongdoers, then, is but an expression of the general obligation to prevent private individuals from engaging in conduct in which the state is prohibited to engage'. Smith, 1988, at p. 37; Jennings and Watts (eds.), 1996, at p. 509.

[132] United States Diplomatic and Consular Staff in Tehran, Judgment, ICJ Reports 1980, p. 3.

[133] This Convention was concluded in Vienna on 24 April 1963 and entered into force on 19 March 1967, available at: http://untreaty.un.org/ilc/texts/instruments/english/conventions/9_2_1963.pdf (accessed on 11.4.2012).

[134] This Treaty was concluded in Tehran on 15 Aug 1955 and entered into force on 61 June 1957, available at: http://www.parstimes.com/law/iran_us_treaty.html (accessed on 11.4.2012).

[135] The Court stated that the fact that 'the initiation of the attack on the United States Embassy on 4 November 1979, and of the attacks on the Consulates at Tabriz and Shiraz the following day, cannot be considered as in itself imputable to the Iranian State does not mean that Iran is, in consequence, free of any responsibility in regard to those attacks; for its own conduct was in conflict with its international obligations. By a number of provisions of the Vienna Conventions of 1961 and 1963, Iran was placed under the most categorical obligations, as a receiving State, to take appropriate steps to ensure the protection of the United States Embassy and Consulates, their staffs, their archives, their means of communication and the freedom of movement of the members of their staffs'. ICJ Reports, 1980, at p. 30, para. 61.

[136] ICJ Reports, 1980, at p. 34, para. 73.

or ratified such acts.[137] These two cases are considered to be applications of Article 8 of the Articles under which the State is responsible if the private person is acting under its direction or control and Article 11 of the Articles under which the State is responsible for acts of private persons if it has acknowledged and approved these acts as its own.

In conclusion, under international law, the State is not responsible for private conduct. However, according to the current interpretation of the rules of international law by the doctrine of international law, international jurisprudence and international decisions, the State is not responsible for private conduct when it has observed the due diligence and did not approve or ratify such conduct. Thus, the State is not responsible for private acts or acts of its citizens in relation to a violation of environmental obligations related to nuclear activities, unless it has failed to pursue due diligence to control the conduct of individuals in its territory or under its jurisdiction of control or has approved and ratified their acts. This is important in relation to nuclear activities because if the State has carefully observed due diligence and controlled private conduct and activities, it could avoid – or at least reduce – the occurrence of nuclear accidents and avoid responsibility for environmental damage caused by such accidents. However, this is not sufficient in relation to the issue of nuclear safety, as most of the nuclear installations are operated by private operators and the nuclear safety has to be ensured by the operator of a nuclear installation and the State. Nuclear safety is the cornerstone to prevent a nuclear accident and environmental damage to other States, and should entirely be the responsibility of the State.

7.4.2 A breach of nuclear and environmental obligations: The objective element

This section discusses the most important issues that indicate a breach of an international obligation as an element of State responsibility for wrongful acts resulting from the violation of nuclear and environmental obligations,[138] including different sorts of violations of international obligations (section 7.4.2.1), standards to consider the conduct of a State as a breach of rules of

[137] The Commission stated that '[o]ne nation is not responsible to another for the acts of its individual citizens, except when it approves or ratifies them. It then becomes a public concern, and the injured party may consider the nation itself the real author of the injury. And this approval, it is apprehended, need not be in express terms; but may fairly be inferred from a refusal to provide means of reparation when such means are possible; or from its pardon of the offender when such pardon necessarily deprives the injured party of all redress'. Cited in YILC, 1972, Vol. II, at p. 101, para. 77.

[138] For breach of conduct, see ILR, Vol. 24, 1957, at pp. 291-300; Smith, 1988, at p. 9.

international law (section 7.4.2.2), serious breaches of peremptory norms of international law (section 7.4.2.3), and the time and extent of the violation of an international obligation (section 7.4.2.4).

7.4.2.1 Forms of violation: The commission and omission of an act

The breach of an international obligation can be in the form of a commission or omission of an act by the legislative, judicial and executive authorities or any high-ranking person or person with a lesser rank, such as the Head of State or the prime minister or any other person entitled to act on behalf of the State. The State's conduct constitutes a breach of an international obligation when one State has committed or omitted an act against international law.[139] An act of the State is described as a wrongful act when it is not in conformity with what is required by the obligation under international law.[140] In the Corfu Channel Case, Judge Winiarski stated in his dissenting opinion that:

> 'In international law, every State is responsible for an unlawful act, if it has committed that act, or has failed to take the necessary steps to prevent an unlawful act, or has omitted to take the necessary steps to detect and punish the authors of an unlawful act. Each of these omissions involves a State's, responsibility in international law, just like the commission of the act itself.'[141]

Thus a wrongful act of a State may have a positive or negative character. It has a positive character when a State commits an act against the rules of international law. For example, if the State has disposed of nuclear waste at sea contrary to international law obligations. However, it has a negative character when a State has omitted to carry out actions which are required according to an international obligation.[142] There are several primary obligations included in chapters 4 and 5 which have to be performed by the State. The failure to meet these obligations constitutes a wrongful act of the State. For instance, the State commits a wrongful act when it has failed to provide the relevant information about the construction of a nuclear installation to the State affected by the activity or failed to cooperate with them or did not inform them of a nuclear accident according to a convention that has been concluded. According to Article IX of the Space Treaty, 'States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful

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[139] Franck Latty, "Actions and Omissions", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 355-363.
[140] Article 12 of the ILC Draft Articles on State Responsibility.
[141] See Corfu Channel, Merits, ICJ Reports 1949, p. 4, at p. 52, dissenting opinion by Judge Winiarski.
[142] Smith, 1988, at p. 10.

contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose'.[143]

Accordingly, State responsibility is incurred as a result of an act by the legislative authority when, for instance, it has enacted legislation contrary to the international obligations of the State or it has failed to enact legislation required to implement the obligations of the State. To apply this rule in the case of nuclear activities, the State is obliged to enact legislation that is necessary to regulate the use of nuclear energy conducted within its territory or under its jurisdiction or control, such as nuclear liability legislation and nuclear safety legislation to apply to the nuclear liability conventions and nuclear safety conventions. On the other hand, it is prohibited to enact any legislation to dispose of high-level radioactive substance at sea contrary to the existing rules of international law.

Similarly, conduct of the judicial authority constitutes a wrongful act and entails State responsibility if it has failed to apply a national law or applied it contrary to international law or if it has denied foreigners the opportunity to bring their claims before national courts, so-called, "denial of justice". The breach of this principle constitutes State responsibility. This principle evolved with the principle of 'the international minimum standard of treatment' which requires a minimum treatment of foreigners by the host State.[144] The principle of the denial of justice has a broader concept which applies to the judicial, legislative and administrative acts.[145]

Finally, an act of the executive authority constitutes State responsibility if it has acted against international law. For example, the State is in breach of international law if it has not given notification of a nuclear accident or has refused to cooperate with other States in providing the necessary information about a nuclear activity or a nuclear accident. One specific example is Arti-

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[143] See Resolution adopted by the General Assembly (2222 (XXI)). Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1499th plenary meeting, 19 December 1966, available at: http://www.oosa.unvienna.org/oosa/en/SpaceLaw/gares/html/gares_21_2222.html (accessed on 10.4.2012).

[144] D'Amato and Engel, VLR, Vol. 74, No. 6, 1988, at p. 1030.

[145] D'Amato and Engel, VLR, Vol. 74, No. 6, 1988, at pp. 1031-1033. Also see the case concerning "The Interoceanic Railway of Mexico (Acapulco to Veracruz) (Ltd.), and the Mexican Eastern Railway Company (Ltd.), and the Mexican Southern Railway (Ltd.) (Great Britain) v. United Mexican States", Decision No. 53, 18 June 1931, RIAA, Vol. V, pp. 178-190, at p. 185; A. A. Cançado Trindadé, "Denial of Justice and its Relationship to Exhaustion of Local Remedies in International Law", in: PLJ, Vol. 53, 1978, pp. 404-420.

cle 23 of the 1982 UNCLOS concerning foreign nuclear-powered ships and ships carrying nuclear or other inherently dangerous or noxious substances. According to this Article, '[f]oreign nuclear-powered ships and ships carrying nuclear or other inherently dangerous or noxious substances shall, when exercising the right of innocent passage through the territorial sea, carry documents and observe special precautionary measures established for such ships by international agreements'.[146] The State is responsible for violation of this obligation if it has refused the right of innocent passage of a ship via its territorial sea when the ship is in compliance with the rules of international law. In the case of the Chernobyl, the USSR failed to provide information immediately after the accident to the States that were affected or the international organizations concerned.[147] This refusal was a failure on the part of the State to act to prevent environmental damage caused to other State under the principle of prevention in international law.

7.4.2.2 Standard of conduct: Obligations relating to conduct and obligations relating to results

There is no definition of the breach of either international environmental and nuclear obligations or breaches in general by a State. A relevant standard to determine when a State is in breach of an international obligation has therefore been established by the doctrine of international law and the ILC. This standard relies on the distinction between obligations relating to conduct or methods and obligations relating to results.[148] This standard is applied in national law. It is aimed at making it easier to prove that a State is in violation of an international obligation. Obligations relating to conduct rely on the due diligence standard which requires the State to observe certain procedural rules in order to comply with its obligations.[149] It determines the degree of due diligence required by the State to fulfil its obligations. In the case of conducting a nuclear activity, for instance, it determines whether or not environmental obligations correspond to what is required for the obligation to be

[146] Article 23 of the 1982 UNCLOS.

[147] Maria Del Lujan Flores, "The Scope of Customary International Law on the Question of Liability and Compensation for Environmental Damage", in: Najeeb Al-Nauimi and Richard Meese (eds.), International Legal Issues Arising under the United Nations Decade of International Law, Proceedings of Qatar International Law Conference'94, Martinus Nijhoff Publishers, The Hague/London/Boston, 1995, pp. 237-272, at p. 253.

[148] Constantin P. Economides, "Content of the Obligation: Obligations of Means and Obligations of Result", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 371-381.

[149] Pierre-Marie Dupuy, "Reviewing the Difficulties of Codification: on Ago's Classification of Obligations of Means and Obligations of Result in Relation with State Responsibility", in: EJIL, Vol. 10, No. 2, 1999, pp. 371-385, at p. 378.

fulfilled according to international law. However, the obligations relating to results require the State to prevent an event.[150] In the case of a nuclear activity, the State is obliged to prevent a nuclear accident and its harmful consequences for other States.

There are specific examples in practice which can be considered as an application of obligations relating to conduct and obligations relating to results and which are also relevant for the classification of primary obligations. In relation to the obligation relating to conduct, for example, the 1994 Nuclear Safety Convention provides for a number of procedural obligations and certain acts to be undertaken by the Contracting States which are necessary for the safety of nuclear installations. Among these procedural obligations is the obligation of the State to establish a legislative and regulatory framework to govern the issue of nuclear safety[151] and to establish a regulatory body to ensure that this mechanism is implemented.[152] Similarly, Article 210 of the 1982 UNCLOS obliges States to adopt laws and regulations to prevent, reduce and control pollution of the marine environment as a result of dumping. The State is in compliance with the rules of international law if it has fulfilled these obligations, even if environmental damage is caused despite the fulfilment of these obligations. The damage, of course, must be repaired under the principle of absolute liability, but not under responsibility for a wrongful act.

However, in relation to obligations relating to results, Principle 21 of the Stockholm Declaration obliges a State which carries out hazardous activities within its territory or under its jurisdiction or control to ensure, for example, that the activities do not cause damage to the environment of other States. Furthermore, in the Corfu Channel Case the ICJ considered that a State commits an internationally wrongful act when it uses or allows its territory to be used in such a way as to cause harm or injury to the territory of another State or to persons or property in that State.[153] Thus the Court obliges the State to reach a particular result, i.e., not to cause damage to another State. Similarly, obligations relating to results can also be seen in the Trail Smelter Case, in which the Tribunal argued that a State should use its best efforts to achieve a specific result, i.e., the prevention of environmental damage to a neighbouring State.[154]

Accordingly, distinguishing between obligations relating to conduct and obligations relating to results corresponds to the distinction made between

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[150] Crawford, Second Report on State Responsibility, 1999, A/CN.4/498, at para. 85.
[151] Article 7 of the 1994 Convention on Nuclear Safety.
[152] Article 8 of the 1994 Convention on Nuclear Safety.
[153] ICJ Report 1949, p. 4, at p. 22.
[154] Crawford, Second Report on State Responsibility, 1999, A/CN.4/498, YILC, 1999, Vol. II, Part One, at p. 28, at para. 87.

procedural obligations and the obligation of prevention which were discussed in chapters 4 and 5. The procedural obligations are aimed at ensuring certain conduct to prevent a nuclear accident and its harmful consequences. To fulfil these obligations, the State is required to act in a particular way. Therefore the State is in breach of an international obligation if it has failed to fulfil of any of these obligations and there was no need for the occurrence of a nuclear accident or environmental damage. However, the obligation of prevention aims at the prevention of a nuclear accident and its harmful consequences. The principle of prevention, as mentioned, is an essential obligation upon the State under international law to prevent environmental damage caused by a nuclear accident. Accordingly, the State is not responsible for a breach of the obligation of prevention, unless environmental harmful consequences have taken place. The breach of the obligation of prevention corresponds to the obligation relating to results which requires the State to prevent a particular event, i.e., a nuclear accident and its harmful consequences. These obligations are primary obligations. The breach of these obligations requires the application of secondary rules of State responsibility to repair the legal and harmful consequences caused as a result of the breach of these obligations. The State is not only responsible for preventing a nuclear accident by taking all the procedural obligations to prevent such an accident, but it is also responsible for environmental consequences caused by the accident. As Handl stated, 'may be considered [… to have occurred] not when the event occurs but when the prohibited event and negligence imputable to the state coincide'.[155]

Accordingly, the distinction between the procedural and prevention obligations is not quite clear in determining a breach of a State and its environmental obligations. The procedural obligations require a State to perform specific actions to verify whether or not it has complied with the obligations.[156] This indicates the relationship between primary and secondary rules of State responsibility. Thus under obligations relating to conduct, the State is only obliged to act, and not to achieve a result (prevention of harm). However, under obligations relating to results the State must act to prevent the harm. This indicates why some of the doctrine of international law considers that the element of damage is not a constituent element in State responsibility for wrongful acts and the obligation of prevention is not absolute. The State is obliged to act to prevent all damage caused by the presumed activity, although some damage caused to the environment is tolerable.

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[155] G. Handl, "State Liability for Accidental Transboundary Environmental Damage Caused by Private Persons", in: AJIL, Vol. 74, No. 3, 1980, pp. 525-565, at p. 540.
[156] Lefeber, 1996, at pp. 80-81.

Some endeavours have also been made in the doctrine of international law, the ILC and in practice to draw a line between obligations relating to conduct or means and obligations relating to results. It was stated that the 'obligations of conduct require a state to adopt a particular course of conduct, whereas obligations of result leave states free to select the means of their own choice to achieve the result desired'.[157] It was also argued that '[i]n contemporary international law we witness a steadily growing number of affirmative obligations, obligations to ensure a certain result or to prevent a certain result. This leaves the choice of means to the State but entails State responsibility even if private activities have produced the prohibited result or if the State was hindered by private activities to ensure the prescribed result'.[158] Similarly, it was argued that the '[o]bligations of means impose on a State the obligation to do the best they can in furtherance of a specific goal, but without the guarantee that this goal will be reached. By contrast, obligations of result require a State to guarantee the achievement of the prescribed result'.[159] Nevertheless, these arguments involve a theoretical basis to distinguish between obligations of conduct and obligations of result, although they are not relevant in practice to define the breach of an international obligation.

Furthermore, a distinction between obligations of conduct and obligations of result was made by the ILC Draft Articles on State Responsibility for Wrongful Acts adopted on the first reading.[160] The Articles were included four articles dealing with provisions of obligations of conduct and obligations of result. These include Article 20 related to obligations of conduct and Articles 21, 22 and 23 respectively related to obligations of result to achieve a particular result, exhausting local remedies and preventing a particular event.[161] These provisions were discussed by the Commission during the

[157] Lefeber, 1996, at p. 47.
[158] Graefrath, TA, Vol. XX, 1993, at p. 127.
[159] Economides, 2010, at p. 372.
[160] Text of the Draft Articles on State Responsibility provisionally adopted by the ILC on first reading, available at: http://www.javier-leon-diaz.com/humanitarianIssues/State_Resp.pdf (accessed on 21.12.2010).
[161] Article 20: Breach of an international obligation requiring the adoption of a particular course of conduct
'There is a breach by a State of an international obligation requiring it to adopt a particular course of conduct when the conduct of that State is not in conformity with that required of it by that obligation'.
Article 21: Breach of an international obligation requiring the achievement of a specified result

adoption of the Articles on the second reading. However, this distinction was subject to criticism by some writers and by the Commission itself.[162] The Special Rapporteur Crawford argued that the distinction between obligations of conduct and obligations or result is not useful and also makes the application of the Articles complex in practice. Therefore there is no value in drawing distinction and categorizing these obligations.[163] He also stated that a distinction between obligations relating to conduct and obligations relating to results, as presented in the ILC, is relevant only to classification of the primary obligations in international law of responsibility.[164] Moreover, the ILC Articles did not state which standard applies to determine the breach of an international obligation by the State. Thus this standard could be the standard of conduct or the standard to achieve a result. The Draft Articles on international liability for acts not prohibited by international law included provisions related to both standards. For example, they provide for the State to give prior authorization for a hazardous activity. This applies for the standard of conduct. It also obliges the State to prevent the damage caused by the activity. This applies for the standard of result. This result, in the case of a nuclear activity, is the prevention of a nuclear accident and environmental damage caused by the accident. Furthermore, other instruments such as the 1986 Conventions on early notification and assistance in case of a nuclear acci-

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'1. There is a breach by a State of an international obligation requiring it to achieve, by means of its own choice, a specified result if, by the conduct adopted, the State does not achieve the result required of it by that obligation.

2. When the conduct of the State has created a situation not in conformity with the result required of it by an international obligation, but the obligation allows that this or an equivalent result may nevertheless be achieved by subsequent conduct of the State, there is a breach of the obligation only if the State also fails by its subsequent conduct to achieve the result required of it by that obligation'.

Article 22: Exhaustion of local remedies

'When the conduct of a State has created a situation not in conformity with the result required of it by an international obligation concerning the treatment to be accorded to aliens, whether natural or juridical persons, but the obligation allows that this or an equivalent result may nevertheless be achieved by subsequent conduct of the State, there is a breach of the obligation only if the aliens concerned have exhausted the effective local remedies available to them without obtaining the treatment called for by the obligation or, where that is not possible, an equivalent treatment'.

Article 23: Breach of an international obligation to prevent a given event

'When the result required of a State by an international obligation is the prevention, by means of its own choice, of the occurrence of a given event, there is a breach of that obligation only if, by the conduct adopted, the State does not achieve that result'.

[162] Dupuy, EJIL, Vol. 10, No. 2, 1999, at p. 371.

[163] Crawford, EJIL, Vol. 10, No. 2, 1999, at pp. 440-441.

[164] Crawford, EJIL, Vol. 10, No. 2, 1999, at p. 442.

dent also combine and apply both standards. These conventions involve procedural obligations which apply to obligations relating to conduct. Thus the State is not in violation of its obligations, for example, once it has notified the occurrence of a nuclear accident. At the same time these conventions apply to obligations of result, as they are aimed at the prevention and reduction of environmental damage caused by a nuclear accident. Accordingly, because of criticisms voiced by the Governments and in the literature, the articles related to obligations of conduct and obligations relating to results were removed from the 2001 Draft Articles.[165]

7.4.2.3 Serious breaches of peremptory norms: International environmental crime

The peremptory norms of international law are the so-called *jus cogens* norms. These norms are mandatory in international law because they contain the fundamental values and principles which are aimed at the protection of the legal order and interests of the international community as a whole, as well as the fundamental interests of individual States.[166] The Articles prohibit any action considered to be a violation of peremptory norms of international law. Nevertheless, neither the Articles nor the 1969 Vienna Convention on the Law of Treaties determines or provides an exhaustive list of these norms. The peremptory norms of international law, therefore, are determined according to customary international law, state practices and international case law.[167] Under customary international law, a violation of these norms is a serious breach of the obligations for the protection of the whole community or an international crime against the whole international community.[168] The commentaries referred to some examples of peremptory norms which 'are clearly accepted and recognized include the prohibitions of aggression, genocide, slavery, racial discrimination, crimes against humanity and torture,

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[165] María Magdalena Sepúlveda, "The Nature of the Obligations under the International Covenant on Economic, Social and Cultural Rights", Intersentia Publisher, Antwerpen, 2003, at p. 195; Crawford, Second Report on State Responsibility, 1999, A/CN.4/498, at para. 89.

[166] Maja Ménard, "Circumstances Precluding Wrongfulness in the ILC Articles on State Responsibility: Compliance With Peremptory Norms", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 449-453, at p. 449; Riccardo Pisillo Mazzeschi, "Termination and Suspension of Treaties for Breach in the ILC Works on State Responsibility", in: Spinedi and Simma (eds.), 1987, pp. 57-94, at pp. 84-85; Marco Sassòli, "State Responsibility for Violations of International Humanitarian Law", in: IRRC, June, 2002, Vol. 84, No. 846, pp. 401-434, at p. 413.

[167] Ménard, 2010, at p. 450.

[168] YLIC, 1976, Vol. II, Part Two, at p. 97, para. 6.

and the right to self-determination'.[169] In my opinion, a violation of the norms for the protection of the environment of the international community as a whole, particularly those related to the use of nuclear energy, is an international crime against humanity.[170] The violation of these norms could cause a nuclear catastrophe which could affect the environment of the international community as a whole.

However, there is no definition in international law for criminal responsibility in general[171] so that an environmental disaster can be considered as an international crime against humanity. Therefore the ILC discussed the possibility of adopting an article in the Draft Articles on State Responsibility to consider a breach of international obligations related to safeguarding and preserving the human environment of the international community as a whole, as an international crime.[172] This was enshrined in Article 19 of the ILC Draft Articles on State Responsibility adopted on first reading in 1996.[173] This Article considers that an act of a State which constitutes a breach of an international obligation is an internationally wrongful act.[174] The breach of an international obligation by a State must be of essential importance for the protection of the interests of the international community as a whole to be considered as an international crime.[175] The Article listed a number of acts which constitute international crimes.[176] However, an act

[169] YILC, 2001, Vol. II, Part Two, at p. 85, para. 5.
[170] Lammers, EPL, Vol. 31, Issue 1, 2001, at p. 44.
[171] Hans Kelsen, "Principles of International Law", Second Edition, revised and edited by Robert W. Tucker, London, Toronto, New York: Holt, Rinehart & Company, Inc. 1966, at p. 196.
[172] For the development of this question see, James Crawford, "International Crimes of States", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 405-414.
[173] YILC, 1996, Vol. II, Part Two, at p. 60; YILC, 1996, Vol. II, Part One, at p. 2, YILC, 1976, Vol. II, Part Two, at p. 95.
[174] Article 19 (1) of the 1996 Draft Articles on State Responsibility.
[175] Article 19 (2) of the 1996 Draft Articles on State Responsibility.
[176] Article 19 (3) provides that '[s]ubject to paragraph 2, and on the basis of the rules of international law in force, an international crime may result, inter alia, from:
(a) a serious breach of an international obligation of essential importance for the maintenance of international peace and security, such as that prohibiting aggression;
(b) a serious breach of an international obligation of essential importance for safeguarding the right of self-determination of peoples, such as that prohibiting the establishment or maintenance by force of colonial domination;
(c) a serious breach on a widespread scale of an international obligation of essential importance for safeguarding the human being, such as those prohibiting slavery, genocide and apartheid;

committed by a State which does not constitute an international crime was described as an international delict.[177] Thus Article 19 considers '[t]hose acts which are more serious, and which give rise to an aggravated degree of state responsibility toward the international community as a whole, qualify as "international crimes" affecting all states, and would create new rights and obligations for all states'.[178]

However, in 1998, Article 19 was omitted because it was one the obstacles to the Draft Articles being approved by the States.[179] The idea of the criminalization of a State was not accepted by the States.[180] States did not

(d) a serious breach of an international obligation of essential importance for the safeguarding and preservation of the human environment, such as those prohibiting massive pollution of the atmosphere or of the seas'.

[177] Article 19 (4) of the 1996 Draft Articles on State Responsibility.

[178] For reference, see George C. Kasoulides, "State Responsibility and Assessment of Liability for Damage Resulting from Dumping Operation", in: SDLR, Vol. 26, No. 3, 1989, pp. 497-523, at p. 504; Joseph H. H. Weiler, Antonio Cassese and Marina Spinedi (eds.), "International Crimes of States: A Critical Analysis of the International Law Commission's Draft Article 19 on State Responsibility", Walter de Gruyter Berlin, New York, 1988; Nina. H. B. Jørgensen, "The Responsibility of States for International Crimes", Oxford University Press, Oxford, New York, 2000; Georges Abi-Saab, "The Uses of Article 19", in: EJIL, Vol. 10, Issue 2, 1999, pp. 339-351; Giorgio Gaja, "Should all References to International Crimes Disappear from the International Law Commission Draft Articles on State Responsibility?" in: EJIL, Vol. 10, Issue 2, 1999, pp. 365-370; Alain Pellet, "Can a State Commit a Crime? Definitely, Yes!" in: EJIL, Vol. 10, No. 2, 1999, pp. 425-434; Christian Tomuschat, "International Crimes by States: An Endangered Species?" in: K. Wellens (ed.) "International Law: Theory and Practice: Martinus Nijhoff, The Hague 1998, pp. 253-274; Bernhard Graefrath, "International Crimes and Collective Security", in: K. Wellens (ed.) "International Law: Theory and Practice", 1998, pp. 237-252; Shabatia Rosenne, "State Responsibility and International Crimes: Further Reflection on Article 19 of the Draft Articles on State Responsibility", in: NYUJILP, Vol. 30, Issues 1-2,1998, pp. 145-166; Derek William Bowett, "Crimes of States and the 1996 Report of the International Law Commission", in: EJIL, Vol. 9, Issue 1, 1998, pp. 163-173; Nina H. B. Jørgensen, "A Reappraisal of Punitive Damages in International Law", in: BYIL, Vol. 68, 1997, pp. 247266; Robert Rosenstock, "An International Criminal Responsibility of States? in: International Law on the Eve of the Twenty-First Century: Views from the International Law Commission, United Nations New York, 1997, pp. 265-285; Geoff Gilbert, "The Criminal Responsibility of States", in: BYIL, Vol. 39, Issue 1990, pp. 345-369; Crawford, Peel and Olleson, EJIL, Vol. 12, No. 5, 2001, at p. 976.

[179] Crawford, EJIL, Vol. 10, No. 2, 1999, at p. 442; Crawford, First Report on State Responsibility, UN Doc. A/CN. 4/490/Add.1, UN Doc. A/CN. 4/490/Add.2, UN Doc. A/CN. 4/490/Add.3.

[180] Alain Pellet, "The ILC's Articles on State Responsibility for Internationally Wrongful Acts and Related Texts", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 75-94, at p. 81; Crawford, EJIL, Vol. 10, No. 2, 1999, at p. 443.

accept being described as criminal. The Special Rapporteur Crawford reached the conclusion that the only criminal responsibility under current international law is individual responsibility, because the term as adopted in Article 19 is not different from the ordinary meaning in international law.[181] Thus the concept of international criminal responsibility of the State was excluded from the 2001 ILC Draft Articles on State responsibility.[182] Causing environmental damage to the environment is no longer considered a crime in international law.

Therefore Article 40 relating to a serious breach by a State of its obligations was adopted as an alternative to Article 19, to apply instead of criminal responsibility.[183] It ensures the respect of international obligations by the States and the reparation or compensation for damage caused by the State to other States. It considers a serious breach of an international obligation by a State to be an internationally wrongful act and thus it does not impose criminal responsibility on the State. According to this Article, '[a] breach of such an obligation is serious if it involves a gross or systematic failure by the responsible State to fulfil the obligation'.[184] To determine the scope of serious breaches of international obligations, the ILC established two criteria that distinguish between serious breaches of obligations under peremptory norms of international law and other types of breach. The first relies on determining the character of the breached obligation which must derive from a peremptory norm of general international law, and the second qualifies the intensity of the breach which must be serious in nature.[185] However, these criteria are not clear in practice, and it is rather difficult to draw a line between serious breaches of international obligations and a normal breach of such obligations. It was argued that '[a]lthough the term "crime" was removed from the final draft, the substance of the concept remained unchanged, and was even reinforced'.[186]

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[181] Andrea Gattini, "Smoking/No Smoking: Some Remarks on the Current Place of Fault in the ILC Draft Articles on State Responsibility", in: EJIL, Vol. 10, No. 2, 1999, pp. 397-404, at p. 400; also see Bodansky and Crook, AJIL, Vol. 96, Issue 4, 2002, at p. 784.
[182] Crawford and Olleson, 2010, at p. 449.
[183] Dinah Shelton, "Righting Wrongs: Reparations in the Articles on State Responsibility", in: AJIL, Vol. 96, Issue 4, 2002, pp. 833-856, at p. 842.
[184] Article 40 (2) of the Draft Articles on State Responsibility.
[185] The 2001 Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries, Report of the International Law Commission on the work of its fifty-third session, at p. 112.
[186] Economides, 2010, at p. 373.

Nevertheless, the scope of Article 19 was stricter and broader than Article 40 of the Articles.[187] This guarantees that the State cannot escape its responsibility. The criminal responsibility of the State as defined in Article 19 is certainly an important instrument for the protection of the environment, particularly from damage caused by nuclear activities which need strict rules of State responsibility to ensure the protection of the environment. In our opinion, individual criminal responsibility can be attributed to the organ of the State which committed the wrongful act under international criminal law if the act constituted one of acts listed under Article 19. Originally, the State cannot be held responsible as an international entity, but wrongful acts of its organs are nevertheless attributed to it. Similarly, criminal responsibility should be attributed to the State, but the organ which committed the wrongful act should pay the penalty if it committed the act intentionally. At present, international criminal law has wider applications, particularly since the establishment of the ad hoc international criminal courts, including the ICC, and the establishment of an ad hoc forum of the environment.

7.4.2.4 The existence and duration of the breach

The State is responsible for a wrongful act under international law when there is a breach of an international obligation and for the duration of the breach of that obligation on the part of the State.[188] The State is in breach of an international obligation if that obligation is not in conformity with what is required by the State to fulfil its obligation under international law irrespective of its origin or character.[189] The origin and basis of State responsibility for the breach of an international obligation are derived from obligations in a treaty, international custom, international principle, judicial decision or any other source of international law. However, the character of an international obligation can be determined according to the facts of each case in the light of the source of the obligation.[190]

The State is also responsible for a wrongful act if the obligation concerned is in force and valid as regards the State. However, in my opinion, this issue only applies in the case of a breach of an international obligation arising from a treaty, including environmental and nuclear treaties. This is because in the case of applicable sources of international law other than

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[187] Antonio Cassese, "The Character of the Violated Obligation", in: Crawford, Pellet, and Olleson (eds.), 2010, pp. 415-420, at pp. 415-416.
[188] Jean Salmon, "Duration of the Breach", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 383-396.
[189] Article 12 of the 2001 ILC Draft Articles on State Responsibility.
[190] Aust, 2010, at p. 382.

treaty law, it is difficult to determine when an international obligation is in force and valid as regards the State. According to the 1969 Vienna Convention on the Law of Treaties, the provision of a treaty enters into force when the consent of a State to be bound by a treaty has been established and after the treaty comes into force. The Contracting States are bound by the treaty from that time.[191] Thus the breach of a treaty starts from the moment at which a treaty is valid as regards the State that committed the act. According to the Articles: 'An act of a State does not constitute a breach of an international obligation unless the State is bound by the obligation in question at the time the act occurs'.[192] Thus the breach of an international obligation must be considered at the time the act occurred and the dispute took place. According to the Articles, an act of a State which constitutes a beach of an international obligation which took place before the obligations of the State applied is not considered a wrongful act. Furthermore, the preparatory conduct prior to the act is not considered a wrongful act. This was recognized by the ICJ in Gabčíkovo-Nagymaros Project case. In its Judgment the Court stated that:

> 'A wrongful act or offence is frequently preceded by preparatory actions which are not to be confused with the act or offence itself. It is as well to distinguish between the actual commission of a wrongful act (whether instantaneous or continuous) and the conduct prior to that act which is of a preparatory character and which 'does not qualify as a wrongful act'.[193]

However, in some cases, a breach of an international obligation occurs in the form of a continuing wrongful act and in other cases it occurs as a series of wrongful acts. Therefore the Articles determine when a breach of an international obligation by an act begins and ends, particularly in cases in which the breach consists of a series of wrongful acts. Accordingly, an act of a State that does not have a continuing character is considered a breach of an international obligation at the moment in which the act is performed, even if its harmful effects are still continuing.[194] The continued harmful effects of a wrongful act by a State after it has been completed are related to the consequences of State responsibility which should be repaired or compensated.[195] Thus '[t]he accident at the Chernobyl nuclear plant may by characterized as an instantaneous breach, since the delictual conduct took place at a specific

[191] Article 24 of the 1969 Vienna Convention on the Law of Treaties.
[192] Article 13 of the 2001 ILC Draft Articles on State Responsibility.
[193] Gabčíkovo-Nagymaros Project, (Hungary/Slovakia), Judgment of 25 September 1997, ICJ Reports 1997, p. 7, at p. 54, para. 79.
[194] Article 14 (1) of the 2001 ILC Draft Articles on State Responsibility.
[195] Aust, 2010, at p. 382.

time and place even if the effects remain of a continuing character'.[196] However, it is considered as a breach of an international obligation as an act of a State that has a continuing character, even if it was taken to prevent a given event. The breach applies for the entire period that the wrongful act continues.[197] Finally, the breach of an international obligation which consists of a series of acts of a State is a wrongful act while it continues, even if these acts occurred when other acts or omissions occur.[198] These acts are considered as a continuing breach of an obligation and the responsibility of the State continues to apply during the entire period of the breach until the conduct is in conformity with the obligation.[199] The procedural obligations for the construction of a nuclear installation are considered have a continuing character. The failure of the State to comply with the obligations of consultation, notification, cooperation, etc. applies until the State complies with the conditions required for the fulfilment of the obligation.[200]

Accordingly, the State is in breach of an environmental obligation with regard to a nuclear activity if that obligation exists according to any source of international law and is not in conformity with the conditions that must be fulfilled by the State according to international law. A breach of an international obligation applies while the obligation applies and not before its existence. It occurs at the moment that the act is not conformity with the obligation and continues until the act is in conformity with the obligation. A State is in breach of an international obligation for dumping nuclear wastes at sea as long as it is continues to dump such wastes, regardless of whether the dumping has taken place in one or several acts.

7.4.3 Circumstances precluding wrongfulness: Exoneration from responsibility for the violation of environmental and nuclear obligations

Despite the fact that the State commits a wrongful act in the case of conducting a nuclear activity when this act is attributed to it and constitutes a violation of an international obligation, it is not in all cases a wrongful act attributed to the State and State responsibility is invoked in all cases. International law allows for certain circumstances which preclude a wrongful act commit-

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[196] Okowa, 2000, at p. 173.
[197] Article 14 (2) and (3) of the 2001 ILC Draft Articles on State Responsibility.
[198] Article 15 of the 2001 ILC Draft Articles on State Responsibility.
[199] Brownlie, 1983, at p. 194.
[200] Okowa, 2000, at p. 174.

ted by the State.[201] This concerns the third element of State responsibility for a wrongful act that has a negative character. These circumstances have been described by the ILC and are listed in Chapter V of its 2001 ILC Draft Articles on State responsibility. They include the consent of a State, self-defence, counter-measures, force majeure and fortuitous events, distress and necessity.[202] The existence of one of these circumstances justifies waiving State responsibility for a wrongful act and considers it as lawful, even if the act of the State per se constitutes a wrongful act.[203] The grounds for precluding a wrongful act of a State in the case of the existence of these circumstances is the consent of the injured State which, for example, allowed the border State to construct a nuclear reactor along the border, knowing in advance that such a reactor might cause a nuclear accident and damage to its environment. It is also precluded if damage is caused by a nuclear reactor as a result of the violation of international obligations in the case of other circumstances out of the hands of the State. However, this does not mean that the existence of such circumstances automatically waives a State's responsi-

[201] Dominic MacGoldrick, "State Responsibility and the International Covenant on Civil and Political Rights", in: Fitzmaurice and Sarooshi (eds.), 2004, pp. 161-199, at pp. 189-191; Louis Henkin, Richard Crawford Pugh, Oscar Schachter, Hans Smit, "International Law: Cases and Materials: Basic Documents Supplement to International Law", Third Edition, St. Paul, MN, West Group, 1993, pp. 561-566; Crawford, EJIL, Vol. 10, No. 2, 1999, at pp. 443-445; UNGA Doc. A/CN.4/564, 28 February 2006, International Law Commission Fifty-eighth session Geneva, 1 May-9 June and 3 July-11 August 2006, Fourth report on responsibility of international organizations by Special Rapporteur Giorgio Gaja, available at: http://untreaty.un.org/ilc/documentation/english/a_cn4_564.pdf (accessed on 22.4.2012); Jennings and Watts (eds.), 1996, at p. 511; Dieter Fleck, "Individual and State Responsibility for Intelligence Gathering", in: MJIL, Vol. 28, 2007, pp. 687-709, Circumstances precluding wrongfulness, pp. 698-701, available at: http://students.law.umich.edu/mjil/article-pdfs/v28n3-fleck.pdf (accessed on 15.9.2010).

[202] Circumstances precluding wrongfulness as adopted by the ILC Draft Articles on State Responsibility respectively are consent (Article 20), self-defence (Article 21), counter-measures in respect of an internationally wrongful act (Article 22), force majeure (Article 23), distress (Article 24), necessity (Article 25) compliance with peremptory (Article 26) and consequences of invoking a circumstance precluding wrongfulness (Article 27).

[203] This was affirmed by the report of the ILC which states that:
'The act of the State in question cannot be characterized as wrongful for the good reason that, because of the presence of a certain circumstance, the State committing the act was not under an international obligation *in that case* to act otherwise. In other words, there is no wrongfulness when one of the circumstances referred to is present, because by reason of its presence the objective element of the internationally wrongful act, namely, the breach of an international obligation, is lacking'. Report of the International Law Commission on the work of its thirty-first session, YILC, 1979, Vol. II, Part Two, at p. 108, para. 9; YILC, 1980, Vol. II, Part Two, at pp. 34-62.

bility for violating environmental and nuclear obligations. Under international law, these circumstances preclude a wrongful act of the State under certain conditions. In other cases, they do not preclude a wrongful act of a State at all, as in the case of the violation of peremptory norms of international law,[204] including those related to the protection of the environment from damage caused by nuclear activities where such obligations are related to the protection of the environment of the international community as whole.

7.4.3.1 Definition of circumstances precluding wrongfulness

7.4.3.1.1 State consent

The consent of the State has a special importance with regard to nuclear activities, as these activities are always conducted on the basis of agreements between the Installation State and other States on different issues related to nuclear activities. These agreements involve obligations which constitute State responsibility in the case of their violation by any State. Under international law, the consent of the injured State precludes wrongful acts committed against it by the offending State within the limits of the consent.[205] The wrongful act of the State is precluded when it is given consent to carry out activities in a particular case. The consent precludes wrongfulness because of the agreement between two subjects of international law which removes wrongfulness and makes the conduct of the State no longer contrary to international law.[206]

The consent precludes wrongfulness only from the moment at which the consent was given. Accordingly, the valid consent must be given prior to committing the act when there was no violation of the obligation committed. This consent considers the wrongful act committed by the State is in conformity with international law. The consent of the State after committing a wrongful act does not change the nature of the conduct from a wrongful to a lawful act, but only serves as a waiver to the State's right to invoice responsibility and to claim responsibility of the State for the wrongful act,[207] for example, if a State constructed a nuclear installation contrary to an agreement conducted with another State, but the latter accepted the new situation.

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[204] Article 26 of the 2001 ILC Draft Articles on State Responsibility.

[205] Article 20 of the 2001 ILC Draft Articles on State Responsibility provides that '[v]alid consent by a State to the commission of a given act by another State precludes the wrongfulness of that act in relation to the former State to the extent that the act remains within the limits of that consent'.

[206] YILC, 1979, Vol. II, Part Two, at p. 109.

[207] YILC, 1979, Vol. II, Part Two, at p. 113, para. 16.

This consent precludes the responsibility of the former for violating the agreement. The violation of the treaty has already occurred, but the consent removes the State's responsibility for violating the agreement. However, if the injured State has agreed to preclude the responsibility of another State for its wrongful acts, it is difficult for it to claim such responsibility at a later stage.[208]

The consent must also be valid within the limit of the content of the consent. This means that if a State has permitted another State to construct a nuclear installation along its borders, it cannot claim that the Installation State has committed a wrongful act as long as the latter does not violate the conditions of the agreement. Therefore, agreements with neighbouring States are always concluded for border installations in specific cases, such as the 1977 agreement between Denmark and Germany on providing the relevant information about the proposed nuclear installations along the border, which specifies the activities about which States have to provide information.[209] Therefore in most cases the consent as a practical instrument for precluding wrongfulness is related to the law of treaties which determines the conditions that apply in the case of a violation of environmental and nuclear treaties.

Moreover, the State is free to give its consent to precluding a wrongful act on the basis of certain conditions as long as these conditions are accepted by the other State party, such as payment of compensation by the offending State for damage suffered by the wrongful act. These conditions must be subject to the agreement of the two States and they are not considered to be a form of responsibility of the State for a wrongful act.[210]

Finally, the consent only precludes the wrongfulness with regard to a particular State. However, if the obligations that are violated concern more than

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[208] Article 45 of the 2001 State Responsibility provides that '[t]he responsibility of a State may not be invoked if: (*a*) the injured State has validly waived the claim; (*b*) the injured State is to be considered as having, by reason of its conduct, validly acquiesced in the lapse of the claim'. See also Fleck, MJIL, Vol. 28, 2007, at p. 698.

[209] Article 1 provides that '[t]he contracting party of the constructing state shall inform the contracting party of the neighboring state of nuclear installations along the border and make available to it suitable documents. This applies to decisions regarding to locations of a plant, to authorizations of its construction and operation, fundamental changes in such authorizations and to its terminations. Nuclear installations, in the sense of this article are permanent installations for the production, processing and manufacture or fission of nuclear fuels, or for reprocessing of nuclear fuels'. Denmark-Federal Republic of Germany: Agreement Relating the Exchange of Information on the Construction of Nuclear Installations Along the Border, concluded in Bonn and Copenhagen, 4 July 1977, see ILM, Vol. 17, No. 2, 1978, pp. 274-276, available at: http://www.jstor.org/stable/20691854 (accessed on 1.4.2012), (pp.13-14).

[210] YILC, 1979, Vol. II, Part Two, at p. 109, para. 2.

one State, the consent only precludes the wrongfulness of the act as regards those States that have given their consent.[211]

7.4.3.1.2 Self-defence

In contrast to consent, self-defence is not relevant in precluding State responsibility in the case of a violation of nuclear and environmental obligations. Even so, it is certainly one of the legitimate rights in international law which justifies precluding a wrongful act of a State for a breach of an international obligation, provided that it is consist with the United Nations Charter.[212] Article 51 of the Charter determines the conditions for the right of self-defence of a State within the limits of the Charter. However, not all acts of self-defence are relevant in precluding a wrongful act of a State.[213] This was indicated by the ICJ in its advisory opinion on the Legality of the Threat or Use of Nuclear Weapons which considered that nuclear weapons are prohibited per se by treaty law and custom.[214] The Court referred to certain rights which must be protected even in the case of self-defence, particularly those related to human rights which should be protected by the principles of humanitarian law[215] and those related to the protection of the environment from damage caused by nuclear activities.[216] Moreover, there are no circumstances which justify the use of nuclear activities for non-peaceful purposes or nuclear weapons for self-defence.[217] Thus self-defence is not one of the

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[211] Crawford and Olleson, 2006, at p. 468.

[212] Article 21 of the 2001 Articles on State Responsibility.

[213] YILC, 2001, Vol. II, Part Two, at p. 74.

[214] ICJ Reports 1996, p. 226, at p. 244, para. 39.

[215] ICJ Reports 1996, p. 226, at p. 261, para. 89.

[216] In its advisory opinion on the Legality of the Threat or Use of Nuclear Weapons the ICJ referred to the rules of international humanitarian law and the protection of the environment. It stated that 'the Court is of the view that the issue is not whether the treaties relating to the protection of the environment are or are not applicable during an armed conflict, but rather whether the obligations stemming from these treaties were intended to be obligations of total restraint during military conflict.

The Court does not consider that the treaties in question could have intended to deprive a State of the exercise of its right of self-defence under international law because of its obligations to protect the environment. Nonetheless, States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality'. ICJ Reports 1996, p. 226, at p. 242, para. 30.

[217] In its Advisory Opinion on nuclear weapons the ICJ stated that '[t]he Court notes by way of introduction that international customary and treaty law does not contain any specific prescription authorizing the threat or use of nuclear weapons or any other weapon in general or in certain circumstances, in particular those of the exercise of le-

circumstances which precludes a wrongful act and removes responsibility in the case of nuclear activities. A wrongful act of a State resulting from the use of nuclear energy for nuclear weapons or for the use of a nuclear civilian installation for the enrichment of nuclear material for the production of nuclear weapons cannot be precluded. The use of a nuclear weapon causes an environmental catastrophe which may be considered as genocide or a crime against humanity. Under the Articles such acts are a violation of peremptory norms of international law which are not precluded.[218] It is difficult to accept the argument for using nuclear weapons for self-defence, when other peaceful options have not been used, or for the use of nuclear substances produced by a nuclear installation for self-defence. Therefore all the instruments relating to nuclear activities provide for the use of nuclear materials for peaceful purposes and prohibit their use for non-peaceful ends.[219]

7.4.3.1.3 Countermeasures

According to Article 22 of the 2001 ILC Draft Articles on State Responsibility: 'The wrongfulness of an act of a State not in conformity with an international obligation towards another State is precluded if and to the extent that the act constitutes a countermeasure taken against the latter State in accor-

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gitimate self-defence. Nor, however, is there any principle or rule of international law which would make the legality of the threat or use of nuclear weapons or of any other weapons dependent on a specific authorization. State practice shows that the illegality of the use of certain weapons as such does not result from an absence of authorization but, on the contrary, is formulated in terms of prohibition'. Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, ICJ Reports 1996, p. 226, at p. 247, para. 52.

[218] Article 26 of the 2001 ILC Draft Articles on State Responsibility.

[219] For example, the Space Treaty prohibits the use of outer space for non-peaceful uses. Article IV of this Treaty provides that 'States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited'. See Resolution adopted by the General Assembly (2222 (XXI)), Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1499th plenary meeting, 19 December 1966, available at: http://www.oosa.unvienna.org/oosa/en/SpaceLaw/gares/html/gares_21_2222.html (accessed on 7.3.2011).

dance with chapter II of part three'.[220] The latter determines the conditions required for limitations on invoking countermeasures by the injured State against a State responsible for a wrongful act.[221] The most important of these conditions is that the countermeasures must be legitimate and must meet other conditions which limit invoking countermeasures, including the exhaustion of international remedies and proportionality.[222] Accordingly, 'the temporary non-performance of an unconnected treaty obligation may be justified as a response to the breach by a state of one of its obligations, subject to fulfilment of the requirement of proportionality and the other conditions set out in the Articles'.[223] These conditions limit the right of a State to use countermeasures to preclude its wrongful acts in the case of a violation of environmental obligations. This is in the interests of protecting the common environment.

In the Case Concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia), the Court admitted that the breach of a treaty justifies taking countermeasures. Both Slovakia and Hungary claimed that invoking countermeasures precluded their wrongful acts. The Court examined the conditions of the countermeasures and dismissed the claims of both States because they were not entitled to apply countermeasures. The Court found that Slovakia did not meet the condition of proportionality based on its claim to unilateral control of shared natural resources.[224] The Court also rejected Hungary's claim based on the breach of environmental obligations under the general rules of international law and the material breach of the 1977 Treaty

[220] It seems that the Articles make a connection between self-defence and countermeasures, as Article 21 provides for Self-defence and is followed by Article 22 which provides for countermeasures as one of the circumstances precluding an internationally wrongful act. Self-defence precludes wrongfulness of a State if it complies with the conditions of self-defence under international law. However, if the State has not complied with the required conditions of self-defence and has exceeded the limit in international law, another State has the right to take countermeasures to defend its interests which are also considered circumstances precluding wrongfulness.

[221] For countermeasures in part three of the Articles and the required conditions for precluding a wrongful act of a State, see Articles 49-54 of the 2001 ILC Draft Articles on State Responsibility.

[222] Lefeber, 1996, at p. 99.

[223] James Crawford and Simon Olleson, "The Exception of Non-Performance: Links between the Law of Treaties and the Law of State Responsibility", in: AYIL, Vol. 21, 2001 pp. 55-74, and pp. 1-21, at p. 4, available at: http://www.lcil.cam.ac.uk/Media/ILCSR/exception.doc (accessed on 20.1.2011).

[224] Loibl, 2004, at pp. 206-207.

because its claims did not constitute the conditions for termination of the law of treaties under international law.[225]

7.4.3.1.4 Force majeure and fortuitous events

Force majeure and fortuitous events are circumstances which preclude a wrongful act of a State in the case of a violation of environmental and nuclear obligations. This is because the conduct of the State in such circumstances is not under control, or is involuntary or unintentional.[226] They justify the non-performance of international obligations during the period of the existence of the event, but they cannot terminate a treaty. This is left to be decided by the State parties.[227] Force majeure creates a situation which makes it impossible for the State to meet its international obligations and avoid breaching them. However, force majeure cannot preclude a wrongful act of a State if the situation that was created made it difficult for the State to meet its obligations.[228] This was recognized in Article 23 of the 2001 ILC Draft Articles on State Responsibility.[229] This Article precludes the wrongfulness of an act of a State if the act is due to the 'occurrence of an irresistible force or of an unforeseen event, beyond the control of the State, making it materially impossible in the circumstances to perform the obligation'.[230] Furthermore, a wrongful act of a State cannot be precluded if the force majeure or an unforeseen event is due to the conduct of the State invoking it, or if the State has foreseen the risk of such a situation occurring.[231] This can be linked to the sitting of a nuclear installation and the occurrence of a nuclear accident.[232] For example, the non-compliance of a State with the obligation of due care or the safety obligations of a nuclear installation in the case of an earthquake can be justified, and the responsibility of the State for this viola-

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[225] The Court stated: 'As to that part of Hungary's argument which was based on other treaties and general rules of international law, the Court is of the view that it is only a material breach of the treaty itself, by a State party to that treaty, which entitles the other party to rely on it as a ground for terminating the treaty. The violation of other treaty rules or of rules of general international law may justify the taking of certain measures, including countermeasures, by the injured State, but it does not constitute a ground for termination under the law of treaties'. Gabčíkovo-Nagymaros Project (Hungary/Slovakia) Case, ICJ Reports, 1997, at p. 65, para. 106.

[226] Lammers 1984, at p. 592.

[227] YILC, 1999, Vol. II, Part One, at p. 59, para. 227.

[228] Aust, 2010, at p. 384.

[229] In the earlier draft this Article was Article 31, force majeure and fortuitous event. YILC, 1979, Vol. II, Part Two, at p. 122.

[230] Article 23 (1) of the 2001 ILC Draft Articles on State Responsibility.

[231] Article 23 (2) of the 2001 ILC Draft Articles on State Responsibility.

[232] Kiss, DJILP, Vol. 35, No. 1, at p. 79.

tion can be precluded. The 2011 Fukushima nuclear accident, caused as a result of an earthquake and tsunami, is an example of such a situation.[233] Wrongful acts committed by Japan as a result of the violation of its environmental and nuclear obligations can be precluded. The breach of the 1986 Convention on early notification and assistance in relation to the earthquake is justified by the fact that the earthquake was a case of force majeure and fortuitous event. However, the wrongfulness of an act of the State cannot be precluded if the violation of the State of its international obligations is the reason for the occurrence of the nuclear accident.

7.4.3.1.5 Distress

The situation of distress precludes a wrongful act of a State if the perpetrator of the act has no other reasonable way of saving his life or the lives of other persons entrusted to his care.[234] However, this exemption does not apply if the situation of distress is due to the conduct of the State invoking it, or if the act is likely to create a comparable or greater peril.[235] It was pointed out that these two conditions are linked to those related to force majeure and the state of necessity. There is also a link between the state of distress and circumstances of force majeure and necessity[236] because of their similar character.[237] However, distress can be distinguished from force majeure and is more similar to the state of necessity because the wrongful act committed by the State is not involuntary. Furthermore, the object of the distress is different from that of the state of necessity, as the protected interest is not the same. In the case of distress, the conduct of the organ is attributed to the State if the interest concerned is an immediate concern to save one's life or the lives of others, irrespective of their nationality, while in the case of the state of necessity, the State has to choose between respect for its international obligations and safeguarding a legitimate interest.[238]

In practice, a number of conventions provide for exemptions which define the state of distress as a relevant condition for precluding wrongful acts

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[233] S. G. Vombatkere, "The Fukushima Nuclear Accident: Unmeasured amount of radioactive material discharged into the environment", 13 March 2011, available at: http://www.globalresearch.ca/index.php?context=va&aid=23687 (accessed on 25.2.2012).

[234] Article 24 (1) of the 2001 ILC Draft Articles on State Responsibility.

[235] Article 24 (2) of the 2001 ILC Draft Articles on State Responsibility.

[236] Sandra Szurek, "Circumstances Precluding Wrongfulness in the ILC Articles on State Responsibility: Distress", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 481-489, at p. 482.

[237] YILC, 1979, Vol. II, Part Two, at p. 122.

[238] Szurek, 2010), at p. 483.

in the case of environmental damage.[239] For example, the 1992 OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic is not applied in the case of distress to save human lives or in the case that a vessel or aircraft has been threatened and allows dumping at sea to reduce potential damage.[240] However, it should be noted that the examples of the state of distress referred to above preclude a wrongful act of a State in state practice related to maritime ships and vessels. The argument behind this seems to be that saving the ship and the lives on it is better than leaving to sink. This is because the ship will sink in the situation of distress, the sea will be polluted and the situation will be out of hand. The argument is in favour of saving the ship and the lives on it because the sea will be polluted in any case in that situation.

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[239] Article IV (1) (a) of the International Convention for the Prevention of Pollution of the Sea by Oil, adopted at London, on May 21st 1954, available at: http://www.kenyalaw.org/treaties/treaties/161/International-Convention-for-the-Prevention-of-Pollution (accessed on 3.4.2012); Article V (a), International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, Mexico City, Moscow, Washington, 29 December 1972), available at: http://www.admiraltylawguide.com/conven/dumping1972.html (accessed on 2.4.23.2012); Article 11 of Annex I, Article 6 of Annex II, Article 7 of Annex III and Article 9, Annex IV, the International Convention for the Prevention of Pollution from Ships, adopted at London on 2 November 1973, XII ILM 1319 (1973), available also at: http://sedac.ciesin.org/entri/texts/pollution.from.ships.1973.html (accessed on 3.4.2012); Article 9 (4) of the 1974 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area, available at: http://www.helcom.fi/stc/files/Convention/convention1974.pdf (accessed on 23.1.2011); Article 8 of the 1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft, Oslo, 15 February 1972, available at: http://sedac.ciesin.org/entri/texts/marine.pollution.dumping.ships.aircraft.1972.html (accessed on 13.4.2012).

[240] This Convention provides that: 'The provisions of this Annex concerning dumping shall not apply in case of *force majeure*, due to stress of weather or any other cause, when the safety of human life or of a vessel or aircraft is threatened. Such dumping shall be so conducted as to minimise the likelihood of damage to human or marine life and shall immediately be reported to the Commission, together with full details of the circumstances and of the nature and quantities of the wastes or other matter dumped'. Article 7 of Annex II of the 1992 OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, available at: http://www.ospar.org/html_documents/ospar/html/OSPAR_Convention_e_updated_text_2007.pdf (accessed on 23.1.2011).

7.4.3.1.6 Necessity

According to international law, the state of necessity serves as grounds for precluding wrongful acts of a State.[241] A wrongful act committed by a State becomes lawful in the case of necessity if the act is aimed at avoiding danger that might be caused and there is no other way to avoid such danger. The State which has committed such an act must prove that the act was necessary to remove the danger in order to preclude a wrongful act and consequently its responsibility. However, in my opinion, this does not mean that the act has become lawful. It is still unlawful; the state of necessity only justifies removing the responsibility of the State for a wrongful act. Article 25 of the Articles determines the conditions required for invoking a state of necessity to preclude a wrongful act of a State, including two positive and other negative conditions. According to the positive conditions, the state of necessity can be invoked if the act of the State is the only way open to the State to safeguard an essential interest in the face of a grave and imminent peril[242] and this act does not seriously harm an essential interest of the State or States for which the obligation exists, or of the international community as a whole.[243] However, according to the negative conditions, the state of necessity may not be invoked if the obligation concerned excludes invoking necessity,[244] or if the State has contributed to the occurrence of the state of necessity.[245]

In the Gabčíkovo-Nagymaros Project Case, the ICJ recognized that a state of necessity constitutes customary international law for precluding wrongful acts of the State.[246] In its judgement the ICJ stated: 'The Court considers, [...], that the state of necessity is a ground recognized by customary international law for precluding the wrongfulness of an act not in conformity with an international obligation. [But...] can only be accepted on an

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[241] YILC, 1980, Vol. II, Part Two, at p. 34.

[242] Article 25 (1) (a) of the 2001 ILC Draft Articles on State Responsibility.

[243] Article 25 (1) (b) of the 2001 ILC Draft Articles on State Responsibility.

[244] Article 25 (2) (a) of the 2001 ILC Draft Articles on State Responsibility.

[245] Article 25 (2) (b) of the 2001 ILC Draft Articles on State Responsibility.

[246] Robert McCorquodale and Martin Dixon, "Cases and Materials on International Law", Fourth Edition, Oxford University Press, New York 2003, at p. 435; Alberto Alvarez-Jiménez, "New Approaches of the State of Necessity in Customary International Law: Insights From WTO Law and Foreign Investment Law", in: ARIA, Vol. XIX, Nos. 3-4, 2008, pp. 463-488, available at: http://www.asil.org/files/ielconferencepapers/alvarez.pdf (accessed on 23.1.2011); Sergey Ripinsky, "State of Necessity: Effect on Compensation", 15 October 2007, at p. 3, available at: http://www.biicl.org/files/3118_s._ripinsky,_state_of_necessity_-_effect_on_compensation_(15_oct_07).pdf (accessed on 23.2.2012).

exceptional basis'.[247] In this Case, Hungary asked the Court invoking the state of necessity to preclude its wrongful acts and avoid responsibility for the suspension of the project in 1989 and the termination of the 1977 treaty in 1992[248] because it suspended the project in order to avoid an environmental disaster. The Court investigated the conditions of the state of necessity and dismissed the claim because it did not meet the conditions of the state of necessity. It acknowledged that the state of necessity is a valid reason for the State to protect an essential interest and justified not acting in conformity with international obligations, but the imminent threat did not exist.[249] In its 1996 Advisory Opinion on the "Legality of the Threat or Use of Nuclear Weapons" the ICJ also stated that 'States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality'.[250] Nevertheless, the state of necessity does not lead to the termination of a treaty because it is a temporary circumstance related to a wrongful act and not a matter independent of the obligations that have been breached.[251] It only justifies the State's non-compliance with international obligations, while the state of necessity is in existence and during the period of emergency.

7.4.3.2 Consequences of invoking a circumstance precluding wrongfulness

When the circumstances precluding wrongfulness no longer exist, the State must comply with the rules of international law and fulfil its environmental obligations as long as these obligations have not been terminated.[252] This was indicated by the ICJ in the Gabčíkovo-Nagymaros Project Case. The Court stated that '[a]s soon as the state of necessity ceases to exist, the duty to comply with treaty obligations revives'.[253]

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[247] ICJ Reports 1997, at p. 40, para. 51.
[248] ICJ Reports 1997, at p. 39, para. 49.
[249] Loibl, 2004, at p. 206.
[250] ICJ Reports, 1996, p. 226, at p. 242, para. 30.
[251] Ian A. Laird, "The Emergency Exception and the State of Necessity", in: Federico Ortino, Lahra Liberti, Audley Sheppard, Hugo Warner (eds.), Investment Treaty Law, Current Issues II: Nationality and Equitable Treatment in Investment Treaty Law, Publisher: British Institute of International and Comparative Law, London, 2007, pp. 237-252, at p. 240. For the termination and suspension of treaties, see Mazzeschi, 1987, pp. 57-94.
[252] Article 27 (a) of the 2001 ILC Draft Articles on State Responsibility.
[253] ICJ Reports, 1997, p. 7, at p. 63, para. 101 and also at p. 38, para. 47.

Moreover, even in the case that wrongful acts are precluded, the State is still obliged to pay compensation for material loss suffered as a result of the wrongful act committed by it.[254] However, according to the commentaries, the compensation mentioned in Article 27 of the 2001 ILC Draft Articles on State Responsibility is not related to the compensation for reparation for a wrongful act as provided for under Article 34 of the Articles. It is only related to compensation for material loss directly suffered by the State as a result of a circumstance precluding a wrongful act.[255] The commentaries also stated that the concept of material loss referred to in Article 27 is narrower than the concept of damage referred to elsewhere in the Articles. It only relates to the adjustment of losses drawn up by the State invoking a circumstance precluding a wrongful act.[256] Finally, Article 27 does not determine in which circumstances compensation is required and leaves this to be decided in the agreement between the State invoking a circumstance precluding a wrongful act and the affected States. They can agree on the possibility and extent of the required compensation for material loss suffered by such a circumstance.[257] Thus precluding a wrongful act cannot justify damage caused to the environment; it only serves to defend a State against the responsibility for a wrongful act. Environmental damage must be repaired according to the rules of absolute liability as we shall see later in the next chapter. State liability for environmental damage is absolute, but under the nuclear liability conventions certain circumstances exonerate the operator of a nuclear installation from liability.

7.5 Conclusions

The chapter examined the essential aspects of State responsibility for wrongful acts in the light of the ILC Draft Articles on State Responsibility for Wrongful Acts and its application to violations of environmental and nuclear obligations. It revealed that there is a general principle of State responsibility under the Articles applicable in the case of a violation of international obligations in general, including those related to environmental and nuclear activities. After the codification of customary and general rules of State responsibility in the Articles, a claim for environmental damage is now much less difficult to determine than it was only one decade ago. The principle applies to all violations of international obligations unless there is a regime of State responsibility governing a particular sector. Such a regime does not exist

[254] Articles 27 (b) of the 2001 ILC Draft Articles on State Responsibility.
[255] YILC, 2001, Vol. II, Part Two, at p. 86. para. 4.
[256] YILC, 2001, Vol. II, Part Two, at p. 86. para. 4.
[257] YILC, 2001, Vol. II, Part Two, at p. 86. para. 6.

either in the area of the protection of the environment or with regard to nuclear regulations and therefore the principle applies to these issues. Admittedly there are some conventions related to the nuclear and environmental fields, but they do not deal with State responsibility for wrongful acts in the case of a violation of environmental and nuclear obligations.

The principle has already been applied in environmental cases, e.g., the case concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia). There is sufficient evidence in international law to support the principle as a source and basis of State responsibility for wrongful acts as a result of the violation of environmental and nuclear obligations. The establishment of State responsibility creates a new relationship between the offending State and the injured State. The consequence of this relationship in relation to nuclear activities is that the offending State is obliged to respect its international obligations to prevent a nuclear accident and to repair legal and environmental damage caused as a result of its wrongful act. Nevertheless, Article 1 of the ILC Articles, which defined the principle, does not refer to the consequences of international liability as an element in the definition of the principle of State responsibility for wrongful acts.

Furthermore, there is no specific definition of the concept of an internationally wrongful act in the ILC Draft Articles. The Articles only set forth two conditions for a wrongful act of a State to exist, i.e., the attribution of conduct to the State, and the fact that that conduct (commission or omission) must constitute a violation of an international obligation which must be described as a wrongful act in international law. Thus the existence of an internationally wrongful act is determined according to the existing rules of international law, regardless of whether the conduct is described as being lawful in national law. The State cannot rely on a national rule or its constitution to describe an act as an internationally wrongful act. It cannot justify such an act by arguing that that act is in conformity with the existing national law or that it should apply its own national law.

Accordingly, in order for the State to be responsible for wrongful acts related to a violation of environmental obligations in the case of nuclear activities, an act should be attributable to it and be considered contrary to international law. In principle, under international law, acts attributable to the State are those carried out by the officials, organs, agents and representatives of the State, who act as legislative, judicial or executive authorities or other persons who have a real link with those authorities irrespective of their rank. This is the normal standard for attributing conduct to a State. Furthermore, in certain cases the acts of non-officials with real links to the State can be attributed to the State. The ILC Draft Articles determined that the conduct of non-officials can be attributed to the State. This includes the conduct of per-

sons or entities exercising elements of governmental authority; the conduct of organs placed at the disposal of a State by another State; the conduct of a person or group of persons acting on the instructions or under the direction or control of the State; the conduct of persons or entities acting in the absence of the official authorities or if they are in default; the conduct of insurrectionists or other movements; and conduct recognized and adopted by the State as its own.

The conduct of officials and other entities is attributable to the State as long as they have an official status and acted within their competence. Thus acts related to a nuclear issue carried out in their personal capacity are not attributable to the State. However, it is not clear how the Articles apply in the case of the conduct of private persons. This is an important issue in relation to the application of the general rules on State responsibility in the case of a violation of environmental obligations, because most nuclear activities for peaceful ends are carried out by private operators. Furthermore, a nuclear installation may be exposed to sabotage by a terrorist attack or the theft of nuclear substances by private persons. In practice it is difficult to attribute such acts to the State, unless it is proved that the State has been negligent in observing due diligence to control the conduct of those persons.

In addition, the attribution of conduct to the State does not by itself constitute State responsibility, unless that conduct is considered to be a violation of an international obligation. The conduct of the State is considered a breach of international law if the conduct in question is not in conformity with the obligations of the State according to a treaty or custom or general principle of an international judicial decision or any source of international law. There is a difficult issue in relation to determining the peremptory norms of international law or *jus cogens*. These norms include the principles and values which protect the essential interests of the international community as a whole, including those related to the protection of the human environment. In my opinion, the obligations of the State to protect the human environment of the international community as a whole from damage caused by nuclear activities are related to those of the peremptory norms of international law. This is because nuclear activities are the most hazardous activities and damage caused by such activities may damage not only the environment of a particular State, but the international community as a whole. Under the ILC Articles, a breach of peremptory norms is considered a serious breach of international law and not an international crime. Unfortunately Article 19 was eliminated from the final Draft Articles. This had considered a breach of environmental obligations which concerns the international community as a whole to be an international crime. It was excluded from the Articles because the idea of criminalising the State in international law was

rejected. Nevertheless, the adoption of the criminal responsibility of the State is in the interests of the protection of the environment, particularly from damage caused by nuclear activities as one of the most hazardous activities. Strict rules for State responsibility are needed to observe and protect the environment and avoid an environmental catastrophe affecting the whole international community if a major nuclear accident occurs.

However, this new definition of an internationally wrongful act is not consistent with the classical definition which requires, in addition to the previous two elements, i.e., attribution and violation, the element of damage and the causal link between the conduct and the damage. It also revealed that the elements of an internationally wrongful act are interrelated with the elements of State responsibility. The existence of a wrongful act of a State does not mean that there is State responsibility in all cases. The existence of the elements of attribution and breach constitutes only an international wrongful act of the State, i.e., the State may nevertheless not be responsible. The State is responsible once it has been shown that a wrongful act caused damage to another State or to a subject of international law. This is the third element of State responsibility. Finally, the fourth element required to constitute State responsibility for a wrongful act is that there should be no circumstances precluding the wrongful act.

This demonstrates that the regime of State responsibility for wrongful acts under international law is not absolute because there are certain circumstances precluding a wrongful act of a State. These circumstances include State consent, self-defence and countermeasures in self-defence, force majeure and fortuitous events, distress and necessity. The existence of one of these circumstances precludes responsibility on the part of the State in the case of a violation of environmental and nuclear obligations. A wrongful act of the State is considered to be lawful and the injured State cannot claim responsibility. However, in my opinion, the act of State itself is still unlawful and these circumstances may exonerate the State from responsibility but do not remove the wrongfulness of the act. This is because an act of the State is considered a wrongful act when it is attributed to the State and constitutes a breach of an international obligation. These two conditions do not change in normal or abnormal situations. Not all these circumstances are relevant in the case of wrongful acts committed by the State in relation to nuclear activities, such as self-defence, as it is difficult to accept the use of nuclear weapons for self-defence. Furthermore, certain conditions are required for these circumstances to apply, which limit their application and are in the interests of protecting the environment. Indeed, circumstances precluding a wrongful act of the State are not in favour of nuclear activities which must be conducted under strict conditions in order to prevent and reduce environmental

damage caused by nuclear activities which are amongst the most hazardous activities. Therefore wrongful acts of a State which breach the peremptory norms of international law are not precluded under international law. Finally, a wrongful act of a State must be suspended once the circumstances precluding the wrongful act come to an end, and the offending State must pay compensation to the injured State for injuries and loss caused by precluding a wrongful act.

8 THE ABSOLUTE LIABILITY OF A STATE FOR ENVIRONMENTAL DAMAGE CAUSED BY A NUCLEAR ACCIDENT

8.1 Introduction

The preceding analysis indicates that State responsibility for wrongful acts governs responsibility arising out of the performance of a nuclear activity as a lawful activity under international law. It ensures that a nuclear activity as a hazardous activity carried out within the territory of a State or under its jurisdiction or control is conducted in accordance with the required standards for the operation of nuclear activities in order to avoid causing a nuclear accident and its harmful consequences to the environment. Responsibility is attached to the State in the case of the violation of international obligations imposed upon it to prevent a nuclear accident and its harmful consequences for other States. Nevertheless, if a nuclear accident has occurred as a result of the State's violation of its obligations, or if a nuclear accident has occurred accidentally without any violation of international obligation, and has caused environmental damage to other States, this damage must be repaired. The basis of liability is different in the two cases as in the first case liability is based on wrongful act liability, while in the second it is based on risk liability. As chapter 2 showed, a number of major nuclear accidents have occurred in nuclear reactor installations causing a considerable amount of environmental damage to other States. Liability for that damage is based on the principle of risk liability. Thus the basis of liability is determined according to the function of liability. As Judge Higgins argued: 'In the case of environmental matters, no doubt some activities would be on the one basis, and some on the other–that would develop and change as the substantive law on the environment develops and changes. Responsibility would attach to harm, coupled with a failure to meet the required standard of care'.[1]

State responsibility for the failure to meet the required standards for the operation of a nuclear activity was discussed in chapter 7. However, State liability for environmental damage resulting from a nuclear accident based on the principle of absolute liability will be discussed in this chapter. Strict liability for environmental damage caused by a nuclear activity is attached to

[1] Higgins, 1994, at p. 165.

the State or the operator of a nuclear installation once damage has been caused by the accident, regardless of any fault or negligence.[2] Thus the element of damage is the main object of liability under the principle of absolute liability, imposing liability upon the liable person to compensate and repair the environmental damage caused by these activities.[3] As discussed in chapter 3 of the study, in risk liability the element of damage is a constituent element which is necessary to link the liability of the State or the operator to a hazardous activity.[4] Without the occurrence of nuclear damage by a nuclear accident, there is no liability for the State or the operator. Liability for environmental damage caused by a nuclear activity is incurred once the causal link or the relationship between a nuclear activity and the damage has been established.[5]

It should be noted that the concept of strict liability was developed before the emergence of international law. Strict liability had its roots in national legal systems before it was adopted in the nuclear liability conventions. It was applicable in the systems of liability of early societies,[6] Roman law and other national systems, before it appeared in international law.[7] Before the industrial revolution, the origins of strict liability could be found in national liability legislation, but after the industrial revolution it was incorporated into international law to govern liability for damage caused by hazardous activities.[8] The concept of strict liability has been further developed since the industrial revolution as a result of the development of hazardous activities, particularly nuclear activities.[9] It was embodied in several legal liability regimes in the place of fault liability, particularly in treaties dealing with different areas of hazardous activities, including the nuclear liability conventions.[10] There is also evidence in customary international law and

[2] For strict liability see, Zemanek, 1991, pp. 193-195.
[3] Manfred Lachs, "Outer Space, the Moon and Other Celestial Bodies", in: Mohammed Bedjaoui (ed.), International Law: Achievements and Prospects", Martinus Nijhoff Publishers, Dordrecht/Boston, 1991, pp. 959-976, at p. 965.
[4] Pierre Dupuy, "International liability of States for Damage Caused by Transfrontier Pollution", in: NEA, 1977, pp. 345-368, at p. 357.
[5] YILC, 1987, Vol. II, Part Two, at p. 48, para. 186.
[6] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 17.
[7] Horbach, 1996, at p. 112.
[8] Johan Vargo, "Strict Liability for Products: An Achievable Goal", in: In.LR, Vol. 24, No. 3, 1991, pp. 1197-1243, p. 1202.
[9] ILC Secretariat, "Survey on Liability Regimes Relevant to the Topic of International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law", study prepared by the Secretariat, A/CN.4/471, 21 July 1995, at p. 10, YILC, 1995, Vol. II, Part One.
[10] Fadel, 1976, at p. 316.

international case law for the existence and application of risk liability to environmental damage caused by hazardous activities.

This chapter focuses mainly on the examination of the origins and basis of liability under the existing provisions of international law and its application to environmental damage caused by a nuclear accident in accordance with contemporary international law. Unfortunately the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities[11] imposes liability for damage caused by such activities only upon the operator of the activity and excludes the absolute liability of the State.[12] The Installation State is only obliged to ensure that prompt and adequate compensation is provided to victims of environmental damage.[13] In the case of a violation of this obligation, the Installation State will be subject to State responsibility for a wrongful act and compensation by the State will be provided on that basis.[14] Therefore this chapter examines the absolute liability of the State and the operator of a nuclear installation and its connection with the general rules of State responsibility under international law. The absolute liability of the State is governed by the general rules of international law, while the liability of the operator is governed by the nuclear liability conventions and other relevant environmental instruments which are also considered as a source of international liability.

To investigate these issues, the chapter is divided into seven sections. Section 8.2 identifies the general principle of risk liability and the justification for its application to environmental damage caused by nuclear activities. Section 8.3 examines the basis and applications of risk liability of the State according to sources of international law as provided for in Article 38 (1) (c) of the ICJ. Section 8.4 discusses the basis of the strict liability of the operator of a nuclear installation according to sources of international law. Section 8.5 examines the Polluter Pays Principle and its role in nuclear liability. This is because the concept of strict liability is similar to the concept of the Polluter Pays Principle, which channels the economic cost of damage caused by an activity to the source of the damage. Section 8.6 investigates the relationship between the civil liability regime under the nuclear liability conventions and other civil liability regimes with the general rules of international law. This demonstrates the scope for discretion available under international law to decide on claims between two States arising out of a nuclear accident when an international obligation under the nuclear liability conventions or

[11] The 2006 Draft Principles on the Allocation of Loss, see UN Doc. (A/61/10), will be reprinted in YILC, 2006, Vol. II, Part Two.
[12] See chapter 5 of the study.
[13] Principle 4 of the 2006 ILC Draft Principles on the Allocation of Loss.
[14] Lammers, EPL, Vol. 31, Issue, 1, 2001, at p. 47.

under international law has been breached by a State. Section 8.7 concludes that the principle of absolute liability is an essential principle in international law. It applies to environmental damage caused by a nuclear accident, even if State responsibility for wrongful acts has been proven. The existence and application of the strict liability rules under the general rules of international law constitute the original basis of liability applicable to environmental damage caused by a nuclear accident. It is applicable to the Installation State and the operator of a nuclear installation. As a result of the increasing use of hazardous activities, the concept of risk liability is expanding to apply and govern liability for environmental damage caused by these activities.

8.2 The principle of strict liability as a basis of nuclear liability

This section discusses the concept of the principle of strict liability as a legal basis for nuclear liability under the nuclear liability conventions and the general rules of international law. It begins by looking for the reason that fault liability was rejected as a basis of nuclear liability (8.2.1) and then why strict liability is justified (8.2.2). Finally, it identifies the different notions related to strict liability, viz., non-fault liability, absolute liability, strict liability and objective liability (8.2.3).

8.2.1 The rejection of fault liability as a basis of nuclear liability

In national law fault liability relies on the personal liability of the author of the damage.[15] The actor is held liable if he has intentionally breached an obligation or has failed to fulfil a duty and his conduct did not corresponding with the requirements of a standard of conduct.[16] According to this standard, the actor is held liable for damage caused by his conduct to others if he has not behaved in accordance with reasonable conduct. Fault liability is composed of two elements, viz. the psychological attitude of the individual and the objective conduct or material act. The psychological attitude of the individual means that the author of the damage believes that his conduct corresponds to the existing rules of law and normal human behaviour. The objec-

[15] A. Kean, "Shipowner's Liability: A New Approach", in: IAEA and OECD/NEA Third Party Liability and Insurance in the Field of Maritime Carriage of Nuclear Substances, Monaco Symposium 7th – 11th October 1968, OECD 1970, pp. 329-337, at p. 331.

[16] Meinhard Lukas, "Fault Liability", in: Helmut Koziol and Reiner Schulze (eds.), Tort Law of the European Community, Tort and Insurance Law, Vol. 23, Springer-Wien-New York, 2008, pp. 81-102, at p. 81; NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 16.

tive conduct means that the conduct of the individual has caused damage. However, this concept of fault is different from the concept of fault in international law which relies on the objective element, i.e., wrongful intent or negligence on the part of an organ of the State.[17] Thus the State is held responsible for damage caused by a fault of its organs without the need to prove the psychological failure of the organ that caused the damage[18]

It should be noted that as a result of the social commitment to the development of the industrial revolution and the individual tolerance that emerged in the nineteenth century, fault liability increased very rapidly and dominated the field of civil liability law in the national legal systems.[19] However, it later passed from national into international law and at the present time still has many applications in the arena of international law.[20]

However, because of the increase in the negligence of individuals, a great deal of serious damage is caused by the use of new technologies where there is no proof of the fault or negligence on the part of the owner of the machine or the operator of the activity.[21] Furthermore, the use of new technologies in outer space and the use of nuclear energy have caused transboundary damage through no fault of the State conducting the activity.[22] This has led to the rejection of fault liability as a subjective liability to govern liability for damage caused by the new technology, particularly for environmental damage caused by nuclear technology.[23] This raises the question of who pays the costs of injuries suffered by victims of environmental damage which were caused by these activities where the fault of the owner or the operator cannot be proved.[24] It was realized that:

> 'The negligence concept was suitable in an era of extreme individualism. After industrialization became a "fait accompli," [and therefore] strict liability was imposed as a solution to the harsh concepts of contributory negligence and assumption of risk [followed]. Modern technology has greatly advanced since the concept of strict liability and its limitations were originally adopted. There

[17] Aréchaga, 1968, at p. 534.
[18] Aréchaga, 1968, at p. 535.
[19] Vargo, In.LR, Vol. 24, No. 3, 1991, at pp. 1201-1202.
[20] For the fault theory in international law, see Eduardo Jiménez de Aréchaga and Attila Tanzi, "International State Liability", in: Bedjaoui (ed.), 1991, pp. 347-380, at pp. 349-351.
[21] Johan G. Fleming, "The Law of Torts", 5th edition, Sydney: The Law Book Company Ltd., 1977, at pp. 7-8, cited in: ILC Secretariat, Survey, A/CN.4/471, 1995, at p. 9.
[22] Mohmoud K. Banonna, "International Law and the Use of Nuclear Energy", (Arabic version) Cairo 1971, at p. 75.
[23] Aréchaga, and Tanzi, 1991, at p. 351.
[24] Fleming, 1977, at p. 8.

is an immediate need to restructure the doctrine to one of absolute liability with no limitations'.[25]

Therefore, strict liability was given a limited role in national and international law to govern liability for damage caused by new activities such as nuclear activities, electricity, etc. It was applied only in exceptional cases. However, the majority of cases were based on fault. As Lauterpacht observed: '[I]f necessities of international life lead us to the adoption, in certain instances, of the principle of absolute liability, such cases will nevertheless, as they do in private law, constitute an exception to the generally recognized principle of responsibility based on fault'.[26] Furthermore, according to a resolution adopted by the International Law Institute in 1927, the State is not liable 'if the lack of observance of the obligation is not a consequence of a fault of its organs, unless in the particular case, a conventional or customary rule, special to the case, admits of responsibility without fault'.[27]

However, as a result of the industrial revolution in the middle of the twentieth century many industrial activities developed, most notably, nuclear activities, space activities, and other industrial activities, and more recently the information revolution. These activities are hazardous activities, but they have been tolerated by law because they are useful for the community, and have become an essential part of life.[28] At the same time, these activities involve considerable hazards which cannot be ignored, and therefore it is probable that they will cause damage where there is no fault or negligence on the part of the owner or the operator of the activity. Even if the damage has been caused through the fault or negligence of the author of the damage, it is very difficult for the victims to provide proof that he was at fault or negligence and consequently they have to bear their loss themselves. This showed that fault liability cannot provide sufficient protection for victims of damage caused by these hazardous activities.[29] As a result, the social attitude regarding acceptance of fault liability to govern liability for damage caused by these new activities has changed. This demonstrated the need for another

[25] Ahmed Naguib Roushdy, "Maritime Pollution and the Absolute Civil Liability of the Shipowner under the Laws of the United States and Egypt", in: JILE, Vol. 10, 1975, pp. 117-182, at p. 177.
[26] As quoted by Hardy, ICLQ, Vol. 10, 1961, at p. 758.
[27] As quoted by Hardy, ICLQ, Vol. 10, 1961, p. 758.
[28] Constance O'Keefe, "Transboundary Pollution and the Strict Liability Issue: The Work of the International Law Commission on the Topic of International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law", in: DJILP, Vol. 18, No. 2, 1990, pp. 145-208, at pp. 187-188.
[29] Kelson, HILJ, Vol. 13, 1972, pp. 197-244, at p. 200.

basis of liability for damage caused by the new industrial activities.[30] Therefore strict liability was given a wider role to govern liability for damage caused by ultra-hazardous activities, particularly in the field of product liability, to protect consumers from the growing negligence of producers.[31] In the case of the application of fault liability to damage caused by a nuclear accident, victims of environmental damage have a smaller chance of being compensated. This is because of the complicated procedures involved in proving the fault of the State which conducted the nuclear activity or the fault of the operator of a nuclear installation. It is also because environmental damage caused by a nuclear accident can spread to other States and this makes it very complicated to prove that the State or the operator were at fault.[32]

The drafters of the nuclear liability conventions and national nuclear legislation were aware of these facts from the very beginning of the nuclear liability regimes. They decided to base liability for nuclear damage on the principle of strict or absolute liability.[33] It was argued that:

> 'From the beginning, there was no doubt that the nuclear industry was a perfect example of the sort of activity in which the concept of *strict liability* for risk should be applied. Governments, jurists, operators and insurance companies, all agreed. Due to the unusual hazards posed by nuclear activities, it was acknowledged that permission to operate nuclear installations could not be granted unless the operator agreed to accept full responsibility for any injurious consequences. For, despite the utmost precautions, an accident could always occur and it was only just that the cost should be borne by the person who created the risk and not by the innocent victim.
>
> Therefore, in all nuclear liability legislation (except that of the United States […]), the basis of liability is not fault, but strict liability for risk. Strict liability relieves the victim of the burden of [... providing proof of] fault or negligence, requiring the payment of compensation on [the] mere proof of a causal link between the damage and the nuclear accident [... concerned]. Since it would be virtually impossible for any victim to have detailed knowledge of what had taken place in the nuclear installation or [... during] the [... transportation] when the accident occurred, strict liability is necessary for justice'.[34]

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[30] Vargo, In.LR, Vol. 24, No. 3, 1991, at p. 1202.
[31] Vargo, In.LR, Vol. 24, No. 3, 1991, at p. 1202.
[32] Tadeusz Gadkowski, "International Liability of State for Nuclear Damage", Adam Mickiewicz University Press-Poznan Eburon –Delft, 1989, at p. 64.
[33] ILC Secretariat, Survey, A/CN.4/471, 1995, at p. 10.
[34] NEA, Liability and Compensation for Nuclear Damage, 1994, at pp. 22-23.

Accordingly, absolute liability has been adopted as the only basis of liability for nuclear damage, including damage to the environment, in bilateral, multilateral and national nuclear liability regimes. Therefore, as will be discussed below, the principle of absolute liability has been explicitly included in all nuclear liability conventions. It was also adopted by the 1972 Convention for damage caused by space objects.

Nevertheless, in practice, fault liability is not totally excluded as a basis of liability to govern liability for ultra-hazardous activities, but it only applies in exceptional cases.[35] There are some applications of fault liability governing liability for environmental nuclear damage caused by nuclear activities. For example, fault liability was adopted to govern liability for damage caused by space objects as well as absolute liability as a basis of liability under the 1972 Convention for damage caused by space objects.[36] This Convention is the only convention in the field of international liability that applies to nuclear damage caused by space objects. According to this Convention, the launching State of a space object is not responsible for damage caused by the object where the damage is caused in places other than the Earth, unless the fault of the State or the fault of other responsible persons has been proved.[37] Therefore, if nuclear damage is caused by a space object to persons, the property of others or to the environment in outer space, the launching State is not responsible for that damage unless the State is at fault.[38] In addition, there are some arguments that consider the principle of absolute liability is not existed in international law and derived from national law, particularly from common law systems, though they do not consider it as a general principle of liability in international law.[39] Furthermore, some national laws do not consider the principle of absolute liability as a general principle of law. For example, the American nuclear liability law does not recognize this principle as a general rule for the legal basis of liability. Liability under this law is based on the general rules and principles of common law. Liability under these rules may be based on absolute or fault liability in accordance with the law of the State in whose territory a nuclear accident has occurred.[40] Moreover, the nuclear liability conventions exonerate the operator of a nuclear installation from liability where the injured person has inten-

[35] Boyle, JEL, Vol. 17, No.1, 2005, at p. 13.
[36] Article IV (1) (a) of the 1972 Space Liability Convention.
[37] Article III and Article IV (1) (b) and (2) of the 1972 Space Liability Convention.
[38] Lachs, 1991, at p. 965.
[39] YILC, 1987, Vol. II, Part Two, at p. 48, para. 183.
[40] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 81.

tionally caused the damage.[41] Therefore fault liability may be applicable to environmental nuclear damage in cases when the operator is not liable under the applicable nuclear liability regime, as in cases of damage caused by minor nuclear activities, damage caused by low-level radioactivity, damage or loss caused to property on the site of the installation, etc. In such cases, the ordinary law under which absolute or fault liability applies to environmental damage, would be applied.[42]

Therefore, despite the fact that strict liability has been adopted in the nuclear liability conventions as a basis of the liability of the operator, fault liability could apply alongside it in exceptional cases where the fault of the operator has been proved and strict liability cannot be applied. Every theory has its own application. As mentioned above, the former USSR refused to accept liability for the nuclear damage caused by the Chernobyl accident and attributed the liability to the fault and negligence of the operating personnel.[43] At the same time, the USSR was not a Contracting Party to any nuclear liability convention for the regime of strict liability to apply. Despite the fact that the accident caused a considerable amount of damage to the environment of other States, it denied legal liability and only accepted moral liability for damage caused by the accident.[44] Fault liability could also be applicable in the case of negligence on the part of a State with regard to enacting nuclear legislation or where the operator neglected to apply the existing nuclear safety standards for nuclear installations.

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[41] Article X (b) of the 1963 Vienna Convention; Article II (5) of the 1962 Brussels Nuclear Ships Convention.

[42] 'Another possibility is liability for intended harm in the form of the tort of negligence, and this alternative was in fact considered in one of the few cases of injury through radiation, other than those arising from the use of hospital X-rays, which appears in the law reports before 1945. In *La Porte v. United States Radium Corporation* the plaintiff brought an action when she discovered that she was suffering from radium necrosis twelve years after she had left her employment as a radium dial painter. It was argued on her behalf that the defendants, her former employers, should not be allowed in equity to rely on the Statute of Limitations in order to rebut her claim. The Court dismissed this plea, however, and treated the case as one relating solely to negligence. ….' M. J. L. Hardy, "Nuclear Liability: the International General Principles of Law and Further Proposals", in: BYIL, Vol. 36, 1960, pp. 223-249, at pp. 230-231.

[43] Christian Tomuschat, "Some Reflections on the Consequences of a Breach of an Obligation Under International Law", in: Walter Haller, Alfred Kölz, Georg Müller and Danial Thürer (eds.), Im Dienst an der Gemeinschaft: Festschrift Für Dietrich Schindler zum 65. Geburtstag, Verlag Helbing & Lichtenhahn, Basel/Frankfurt am Main 1989, pp. 147-164, at p. 160.

[44] Charles Rousseau, "chronique des faits internationaux", in: RGDDIP, Vol. 91, 1987, pp. 83-156, at p. 86.

8.2.2 Justification of strict liability as a basis of nuclear liability

There are certain grounds that justify the adoption of the concept of strict liability to govern liability for environmental damage caused by hazardous activities, particular nuclear energy.[45] First, nuclear energy has a special character which requires a special guarantee to compensate environmental damage. The use of nuclear energy is a highly complicated matter and involves considerable risks. A nuclear reactor involves risk and may cause serious and widespread damage in many areas, even across the borders of the States in whose territory the installation is located or under whose jurisdiction or control the activity is operated.[46] This creates certain difficulties with regard to applying the rules of fault liability to nuclear damage, as it is difficult for the victims to provide proof of the fault or negligence on the part of the operator. This applies particularly in event of the delayed damage which may become apparent many years after the accident.[47] This justifies the establishment of a regime of liability based on strict liability.[48] It is unfair for the plaintiffs to bear the burden of proof with regard to the fault or negligence on the part of the operator.[49] There is evidence in international environmental law that anyone who conducts a nuclear activity should bear the consequences of the liability at his own risk.[50] Any person who carries out a nuclear activity and benefits from it should compensate the victims for environmental damage suffered by the activity. Strict liability provides protection against hazardous activities by guaranteeing compensation to the victims.[51] Furthermore, it is unfair that the State, which allows a hazardous

[45] See Boyle, JEL, Vol. 17, No.1, 2005, at p. 13; Second report on the legal regime for the allocation of loss in case of transboundary harm arising out of hazardous activities by Pemmaraju Sreenivasa Rao, Special Rapporteur, UN General Assembly doc. A/CN.4/540, 15 March 2004, at p. 26; G. Handl, "International Liability of States for Marine Pollution", in: CYIL, Vol. 21, 1983, pp. 85-117, at pp. 97-98 and at pp. 99-100.
[46] Higgins, 1994, at p. 164.
[47] P. Strohl "The Concept of Nuclear Third Party Liability and Its Implementation by Legislation in OECD Countries", in: IAEA, Experience and in Nuclear Law Trends, IAEA Legal Series, No. 8, 1972 pp. 89-83, at p. 73.
[48] Pelzer, 1994, at p. 270.
[49] Boyle, BYIL, Vol. 60, 1989, p. 302; Roushdy, JILE, Vol. 10, 1975, at p. 178.
[50] José Juste Ruiz, "International Liability for Damage Resulting from Dumping Radioactive Wastes at Sea", in: YML, Vol. IV, 1987-1988, pp. 155-182, at p. 176; Belser, Information Bulletin No. 10 of Study Center of the Permanent Commission of Atomic Risk cited in Camier, 1962, at pp. 49-50.
[51] Strohl, IAEA, Legal Series, No. 8, 1972, p. 72; L. F. E. Goldie, "Liability for Damage and the Progressive of International Law", in: ICLQ, Vol. 14, 1965, pp. 1189-1264, at p. 1207; Kelson, HILJ, Vol. 13, 1972, at p. 200; Arnold Kean, "Strict Liability, Unbreak-

activity in its territory or under its jurisdiction or control in order to benefit economically and develop, should not compensate other States and their victims affected by environmental damage caused by the activity.[52] Strict liability is an adequate basis for nuclear liability for environmental damage caused by a nuclear activity. It makes it easier for victims of a nuclear accident to make claims for nuclear damage or for others to make such claims on their behalf.[53] A strict liability regime guarantees compensation for victims who have suffered environmental damage as the result of a nuclear accident. This is because strict liability obliges the operator of a nuclear installation to compensate damage caused by such activities, regardless of the precautionary measures taken.[54]

In addition, strict liability is an important instrument to motivate the operator and the State to take all possible measures to prevent damage and avoid its economic costs.[55] It is an incentive for the operator of a nuclear installation to do all it can and take every possible preventive measure to prevent a nuclear accident in order to avoid liability. It is also an incentive for the Installation State to observe due diligence with regard to the supervision of the implementation of nuclear safety standards in order to avoid providing the additional compensation which it would have to pay if a major nuclear accident occurred. Goldie argues that '[s]trict liability thus creates a responsibility on the part of an enterprise to prevent injury or to pay the consequences to persons who are threatened by the permissible [activity … and the] abnormal danger which it is perceived to create'.[56] He went on to say that '[c]onditional fault' means that, in undertaking his ultrahazardous activity or venture, the defendant has already created a risk for others for which he will be held accountable in the event of his conduct or products causing harm to others'.[57]

Finally, strict liability helps the development of the nuclear industry because the liability focuses only on one person, i.e., the operator of the nuclear installation. The victims of nuclear damage know they can turn to one person who is liable. This is because of 'the potential liability of suppliers of

able Limits and the Warsaw Convention", in: ICLQ, Vol. 19, 1970, pp. 124-127, at p. 126.

[52] Lammers, EPL, Vol. 31, Issue 1, 2001, at p. 47.

[53] Stoiber, Baer, Pelzer and Tonhauser, 2003, at p. 111.

[54] Aréchaga, and Tanzi, 1991, at p. 352.

[55] B. A. Koch and H. Koziol (eds.), "Unification of Tort Law: Strict Liability", Kluwer Law International, The Hague/London/New York, 2002, at p. 410.

[56] L. E. F. Goldie, "Concepts of Strict and Absolute Liability and the Ranking of Liability in Terms of Relative Exposure to Risk", in: NYIL, Vol. XVI, 1985, pp. 175-248, at pp. 188-189.

[57] Goldie, NYIL, Vol. XVI, 1985, at p. 189.

equipment and/or services to nuclear installations. [The p]otential liability of these persons, or those working in a nuclear installation, would of course severally hamper the development of [the] nuclear industry'.[58] The nuclear liability conventions therefore apply fault liability in limited cases and the operator is obliged to compensate the victims in such cases and has the right of recourse vis-à-vis the liable person afterwards.[59]

8.2.3 The concept of nuclear liability: Strict or absolute liability?

The notion of risk liability as a general notion governing liability for environmental damage caused by hazardous activities is reflected in the doctrine of liability law in different ways.[60] It has been termed absolute liability, strict liability, liability without fault, risk liability, liability for abnormal activities and liability for ultra-hazardous activities. All these notions express one meaning, which indicates that the person liable for damage caused by an ultra-hazardous activity is held liable for damage caused by his activity upon proof provided by the victims of the relationship between the damage suffered and the activity without the need to prove fault or negligence on the part of the liable person. In other words, the victims are required to prove the objective elements of liability without the need to prove the subjective elements. Where the causal link between the damage and the nuclear accident has been proved, the operator cannot escape his liability with the argument that he did not do anything unlawful but complied fully with the regulations and nuclear safety standards.[61]

In practice, there is some confusion regarding the concepts reflected by these terms. This contradiction may stem from the use of different terms with regard to liability which actually indicate the same concept. Exploring the meaning of these terms may remove the confusion and determine the extent of liability.

The term "risk liability" is used to indicate that the liability applies to damage caused by activities involving risk.[62] Consequently the classical

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[58] Horbach, Lacunae, 1999, at pp. 43-44.
[59] Article X of the Vienna Convention; Article 6 (f) of the Paris Convention.
[60] Goldie, ICLQ, Vol. 14, 1965, at pp. 1200, 1215, 1241; Liability for damage caused by lawful activities has been dealt with using different notions, see R. Q. Quentin-Baxter (ILC Rapporteur), UN Doc. A/CN.4/346, para. 16, reproduced in: YILC, 1981, Vol. II, Part One, at p. 106, para. 11.
[61] Nuclear Energy Agency, Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy: Interpretation of the Definition of "Nuclear Incident" in the Paris Convention, Note by the Secretariat, NEA/LEG/DOC(97)1, at p. 3.
[62] Aréchaga, 1968, at pp. 538-540.

conditions of liability applicable to damage caused by "non-risk activities" are excluded.

The same could be said with regard to the term "abnormal liability", since the rules of liability governing "normal activities" are not applicable to damage caused by abnormal activities. The concept of liability for abnormally dangerous activities has been developed by the Anglo-American doctrine on the basis of the British *Rylands v. Fletcher* case of 1868 [63] and was applied in the jurisprudence of the States which apply this doctrine.[64]

Liability is also termed "objective liability" because the objective elements of liability have to be proved by the victims without the need to prove the subjective elements. Victims of the damage need only prove that the damage they suffered resulted from a hazardous activity, and do not need to prove the subjective elements of liability, i.e., the intent or negligence of the person liable for the activity in causing the damage. However, it should be noted that risk liability is the highest degree of objective responsibility in international law.[65] The concept of objective liability in international law was formulated by the Italian jurist Anzilotti at the beginning of the twentieth century.[66] It applies to wrongful act responsibility and strict liability and governs liability for damage caused by lawful and unlawful activities, while strict liability is only applicable to liability for lawful activities. The concept of objective liability has been widely supported by the contemporary writers of international law.[67] The two theories of liability have a real connection with nuclear activities. Wrongful act responsibility entails that the activity has been performed according to the rules of international law.[68] However, strict liability ensures compensation for damage caused by such activities.

On the other hand, "fault liability" relies on the proof of subjective elements of liability. Victims of the damage are required to prove fault or negligence on the part of the operator of the activity; in the case of "non-fault liability" proof of these elements is not required.

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[63] Pelzer, 2000, pp. 421-451, at p. 426.

[64] ILC Secretariat, "Survey of State Practice Relevant to International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law", Study prepared by ILC Secretariat, United Nations, General Assembly, A/CN.4/384, 16 October 1984, International Law Commission, Thirty-Seventh Session, 6 May-26 July 1985, at p. 225, YILC, 1985, Vol. II, Part Two.

[65] Tadeusz Gadkoweski, "International Liability of State for Nuclear Damage", Adam Mickiewicz University Press-Poznan Eburon – Delft, the Netherlands, 1989, at p. 66.

[66] Riccardo Pisillo-Mazzeschi, "The Due Diligence Rule and the Nature of the International Responsibility of States", in: GYIL, Vol. 35, 1992, pp. 9-51, at pp. 14-15.

[67] See, Dupuy, 1977, at p. 365; Hardy, BYIL, 1960, at p. 223; Brownlie, 1983, at p. 46; Handl, CYIL, Vol. 21, 1983, at pp. 96-98.

[68] Aréchaga and Tanzi, 1991, at p. 351.

In the continental legal doctrine liability for hazardous activities is also termed "the theory of exceptional risk", while in the Anglo-American doctrine it is known as "ultra-hazardous" or "abnormally dangerous" activity.[69] Liability for "ultra-hazardous activities" indicates that this liability is for damage caused by hazardous activities. It attaches to the author of the damage without the need to prove his fault or negligence. The term liability for hazardous activity has been widely used in international law after it was introduced by Jenks in his lectures at The Hague Academy of International Law in the mid-1960s. As Jenks pointed out:

> 'The expression ultra-hazardous activities is not a term of art and calls for some definition if it is to serve as the basis of our discussion. It does not imply that the activity is ultra-hazardous in the sense that there is a high degree of probability that the hazard will materialize, but rather that the consequences in the exceptional and perhaps quite improbable event of the hazard materializing may be so far-reaching that special rules concerning the liability for such consequences are necessary if serious injustice and hardship are to be avoided'.[70]

In that sense, hazards arising from an accident caused by a nuclear installation may cause widespread, serious and unlimited environmental consequences.[71] Therefore the doctrine of liability law distinguishes between hazardous and non-hazardous activities. It applies strict liability to damage caused by hazardous activities because they can cause damage even when precautionary measures have been taken.[72] However, non-hazardous activities can be governed by non-fault liability.

Although, all the above-mentioned synonymous notions of liability indicate that liability for damage caused by ultra-hazardous activities attaches to the person liable for the activity without the need to prove his fault or negligence, in general jurists distinguish between strict liability and absolute liability.[73] Put simply, absolute liability means that the person liable for a hazardous activity is liable for all the damage caused by the activity. However, in the case of strict liability, there are certain circumstances which exonerate the liable person from liability in the case of certain circumstances. In the case of liability for nuclear damage, including environmental damage, the two terms "absolute liability" and "strict liability" are used by the doctrine of nuclear liability law in a broad sense. Liability for nuclear damage is some-

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[69] Ruiz, YML, Vol. IV, 1987-1988, at p. 176.
[70] Jenks, RDC, Vol. 117, Part I, 1966, at p. 107.
[71] Birnie and Boyle, 2002, at p. 472.
[72] Fadel, 1976, at p. 318.
[73] Bryan A. Garner, "A Dictionary of Modern Legal Usage", second edition 1995, at p. 836.

times called absolute liability and often strict liability. Nevertheless, under both terms liability is based only on damage caused by a nuclear activity.[74] This simultaneous use has led to the following questions: Is liability for nuclear damage under the nuclear liability regime strict or absolute? Should liability for nuclear damage have a strict or absolute basis? The answer to these questions not only relies on determining the use of terminology, but also depends on the consequences of making a distinction between the concepts expressed by the two terms of liability. In fact, there is no agreement on the use of a single term, either among jurists of liability law or in practice. Sometimes the two terms, "absolute" and "strict" liability, are used to mean the same thing. In other cases, the term "absolute liability" is used as it was defined in the nuclear liability conventions and national nuclear liability legislation.[75] Others distinguish between absolute and strict liability. Because of the exceptional circumstances provided for in the agreements related to the liability for ultra-hazardous activities, it was considered that the term "strict liability" is the correct term.[76] This means that there are degrees of liability when the two terms are used.[77] According to Goldie, there is some variation between the terms "strict" and "absolute" liability as regards the degree of strictness and inflexibility. The term "strict" should be used for the application of non-fault liability to damage caused by nuclear activities rather than the term "absolute".[78] This is because there are some '…disturbances of an international character such as acts of armed conflict and invasion, of a political nature such as civil war and insurrection, or grave natural disasters of exceptional character which are catastrophic and completely unforeseeable, on the grounds that all such matters are the responsibility of the nation as a

[74] 'The terminology varies. It is often convenient to distinguish between *absolute* responsibility (where the defendant state is responsible solely and without exception on the basis of injury having resulted from its conduct) and *strict* responsibility (where the defendant may invoke, as a denial of responsibility, certain very strictly limited defences); since both absolute and strict responsibility depend primarily on the sole fact of injury having occurred, they may both be referred to as involving *objective* responsibility.
Responsibility (whether absolute, strict or based on fault) involves a liability to make reparation. It is thus a separate question whether liability is limited or unlimited. A combination of absolute responsibility and unlimited liability would impose a particularly heavy burden on a defendant state'. Jennings and Watts (eds.), 1996, at p. 509, footnote.

[75] Article IV of the 1963 Vienna Convention.

[76] Percy H. Winfield, "The Myth of Absolute Liability", in: LQR, Vol. 42, 1926, pp. 37-51, at pp. 46 and 51; L.E.F. Goldie, "International Principles of Responsibility for Pollution", in: CJTL, Vol. 9, No. 2, 1970, pp. 283-330, at p. 309 and Goldie, 1975, at p. 75; Brownlie, 1983, at p. 44.

[77] IAEA, INLEX, 2004, footnote 19, at p. 9.

[78] Goldie, CJTL, Vol. 9, No. 2, 1970, at pp. 309-310.

whole'.[79] Therefore the term "absolute" liability as adopted by the nuclear liability conventions is more exclusive than the term "strict".[80]

In addition, the nuclear liability conventions limit the scope of nuclear damage to cover personal and property loss, environmental damage, economic loss and costs of preventive and reinstatement measures and leave other damage, such as damage caused to the means of transport and damage to the installation itself or on the site of the installation uncompensated under the Conventions. These Conventions also limit the liability of the operator in terms of time and amount of compensation. The operator is not liable for environmental nuclear damage where the damage exceeds the limit of the Conventions or where the damage has become apparent after the time limit imposed by the applicable conventions. The Conventions also exclude particular nuclear activities, such as minor activities. In these cases, the operator is not liable under the conventions for environmental nuclear damage caused by these activities even if there is a link between the damage and his nuclear installation. For these reasons, as Jenks argues: 'The principle that liability for nuclear damage is "absolute" is generally accepted, but the expression is somewhat misleading in that it does not exclude the possibility of exceptions'.[81] These exceptions and exonerations of liability are misleading as regards the concept of absolute liability and mean that liability for nuclear damage is strict rather than absolute.[82] They also narrow the scope of nuclear liability for environmental damage caused by a nuclear accident. Therefore it has been argued that nuclear liability should be absolute rather than strict.[83] Nuclear activities are the most hazardous activities and should be conducted under strict rules. The State should be held liable for all environmental damage caused by such activities.

Strict liability is defined as the 'liability which creates an international obligation to compensate merely on grounds of having caused the damage without any requirement of fault or negligence of any kind by the State which caused the damage'.[84] Accordingly, compensation consists only of

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[79] The Explanatory Memorandum of the Convention on Third Party Liability in the Field of Nuclear Energy, done 29 July 1960, para 48, at 249, cited in Goldie, 1975, at pp. 76-77.
[80] Goldie, 1975, at pp. 74-76.
[81] Jenks, RDC, Vol. 117, Part I, 1966, at p. 144.
[82] J. P. H. Trevor, "Third Party Liability: The International Legal Framework and Its Transposition into National Legislation", in: IAEA, Insurance for Nuclear Installations, IAEA Legal Series No. 6, Vienna 1970, pp. 41-47, at p. 41.
[83] Boyle, JEL, Vol. 17, No.1, 2005, at pp. 13-14.
[84] Ruiz, YML, Vol. IV, 1987-1988, at p. 176.

reparation for environmental nuclear damage and the consequences of liability under the nuclear liability conventions.

However, liability for environmental nuclear damage under the nuclear liability conventions is, in principle, *assumed* to be absolute.[85] In our opinion, absolute liability means that the person who is liable for environmental nuclear damage caused by an abnormal activity is liable for all the damage caused by his activity without any limit. It could be termed "absolute" if all the excuses and exonerations are removed.[86] Therefore, the concept of absolute liability is a stricter degree of liability than so-called strict liability, while the latter is stricter than traditional fault liability.

In short, various degrees of liability apply for environmental nuclear damage under the nuclear liability conventions. The highest degree is absolute liability which should be imposed on the operator. The second is strict liability as a standard of liability which applies where there is some exoneration from liability. The third is wrongful act liability which applies in the case of a breach of an obligation under the Conventions. Finally, there is fault liability where there has been negligence or fault on the part of the victim or the operator. However, the operator has to prove the fault or negligence of the victim and vice versa.

8.3 Strict liability of the State for environmental nuclear damage

This section argues for the basis of the strict liability principle in international law and its application to environmental damage caused by nuclear accidents. Section (8.3.1) identifies whether the principle of strict liability has been accepted by the ILC as the basis of State liability for hazardous activities in general and nuclear activities in particular. Section (8.3.2) investigates treaty law applicable to State liability. Section (8.3.3) investigates the general principles of law as a source of liability for environmental damage caused by nuclear activities. Section (8.4.4) examines the doctrine of international law and customary international environmental law. Section (8.3.5) discusses state practice and judicial decisions which apply the principle of strict liability in environmental cases.

[85] Birnie and Boyle, 2002, at p. 473.

[86] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 16; Pelzer, 2000, at p. 426; Horbach, 1996, at p. 83.

8.3.1 State liability for environmental damage caused by hazardous lawful activities: The ILC approach

8.3.1.1 The focus of the ILC Draft Articles on State Liability for Environmental Damage

In 1969, in its report to the General Assembly, the ILC suggested delaying the codification of the question of risk liability for hazardous activities as lawful activities and the responsibility of other subjects of international law, i.e., the responsibility of international organizations for wrongful acts, which is under codification by the ILC at the moment, until a later stage in order to avoid confusion with the topic of State responsibility for wrongful acts.[87] The reason given by the Commission was that 'a joint examination of the two subjects could only make both of them more difficult to grasp'.[88] Accordingly, the Commission deferred the examination of the question of international liability for damage caused by lawful activities. Later, as mentioned, the ILC divided the question of State liability and responsibility into three topics which mainly focused on the codification and development of the general rules of international liability. Nevertheless, liability for damage caused to the environment was particularly taken into account. In one way or another, the three draft articles referred to liability for damage caused to the environment. The starting point was the ILC Draft Articles on State Responsibility which considered a breach of international environmental obligations to constitute an international crime or international delict.[89] Unfortunately, as discussed in chapter 7, this provision was eliminated in the 2001 Draft Articles on State Responsibility because the responsibility was considered to be related to the State and not to individuals.[90]

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[87] The ILC stated that '[t]he Commission also agreed in recognizing the importance, alongside that of responsibility for internationally illicit acts, of the so-called responsibility for risk arising out of the performance of certain lawful activities, such as spatial and nuclear activities. However, questions in this latter category will not be dealt with simultaneously with those in the former category, mainly in order to avoid any confusion between two such sharply different hypotheses, which might have an adverse effect on the understanding of the main subject. Any examination of such questions will therefore be deferred until a later stage in the Commission's work. The same will apply to the study of questions relating to the responsibility of subjects of international law other than States'. YILC, 1969, Vol. II, at p. 233, para. 83.

[88] YILC, 1973, Vol. II, at p. 169.

[89] Article 19 (4) of the 1996 Draft Articles on State Responsibility; Amer, 1981/1982, at p. 201.

[90] Sands, 2003, at p. 895; Note by the Executive Secretary, "Recent Developments in International Law Relating to Liability and Redress", UNEP/CBD/BS/WG-L&R/1/INF/4, 15 April 2005, at p. 5, para. 17, available at:

In 1978, the ILC made a start on the codification of the question under the title "International Liability for Injurious Consequences Arising out of Acts Not Prohibited by International Law",[91] which was codified by the ILC under various titles. Initially the Commission focused its examination mainly on liability for environmental damage.[92] This received wide support from the Special Rapporteurs, Quentin Baxter and Barboza, who preferred to focus on the topic of the environmental issues.[93] This is because it was considered that the topic of liability for environmental damage caused by hazardous activities is different from the topic of State responsibility and the existing environmental agreements do not cover State liability for environmental damage.[94] However, some members of the Commission were in favour of extending the topic to cover damage to the environment of the global commons such as outer space and the high seas.[95] This was a controversial matter for the Commission and therefore the topic of international liability was examined in general, without devoting special attention to liability for environmental damage. Indeed, State liability for environmental damage caused to the global commons was in the interests of protecting the environment from damage caused by nuclear activities. As nuclear activities are not pro-

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Http://www.cbd.int/doc/meetings/bs/bswglr-01/information/bswglr-01-inf-04-en.doc (accessed on 26.2.2012). The issue of international crimes under Article 19 of the ILC Draft Articles on State Responsibility has raised a substantial debate which has been examined in the body of literature see e.g. Giorio Gaia, "Should All References to International Crimes Disappear from the ILC Draft Articles on State Responsibility?" in: EJIL, Vol. 10, Issue 2, 1999, pp. 365-367. Abi-Saab, EJIL, Vol. 10, Issue 2, 1999, pp. 339-351; Bowett, EJIL, Vol. 9, Issue 1, 1998, pp. 163-173; C. Dominicé, "The International Responsibility of States for Breach of Multilateral Obligations", in: EJIL, Vol. 10, Issue 2, 1999, pp. 353-363; B. Graefrath, "International Crimes and Collective Security", in: K. Wellens (ed.), International Law: Theory and Practice: Essays in Honour of Eric Suy, Kluwer, The Hague, 1998, pp. 237-252; Pellet, EJIL, Vol. 10, Issue 2, 1999, pp. 425-434; P. S. Rao, "Comments on Article 19 of the Draft Articles on State Responsibility Adopted by the International Law Commission", in: Ind. JIL, Vol. 37, Issue 4, 1997, pp. 673-676; Rosenne, NYUJILP, Vol. 30, Issue 1-2, 1998, pp. 145-166; Rosenstock, 1997, pp. 265-285; Otto Triffterer, "Prosecution of States for Crimes of State", in: RIDDP, Vol. 67, Issue 1-2, 1996, pp. 345-364; Karl Zemanek, "New Trends in the Enforcement of erga omnes Obligations", in: MPYUNL, Vol. 4, 2000, pp. 1-52.

[91] YILC, 1978, Vol. II, Part Two, at p. 149.

[92] YILC, 1980, Vol. II, Part One, at p. 248, para. 4; YILC, 1980, Vol. II, Part Two, at p. 159, para. 134.

[93] Higgins, 1994, at p. 164.

[94] YILC, 1980, Vol. II, Part One, at p. 248, para. 5. Also see Malgosia Fitzmaurice, "International Responsibility and Liability", in: Bodansky, Brunnee and Hey (eds.), 2007, pp. 1011-1035, at pp. 1017-1018.

[95] YILC, 1986, Vol. II, Part Two, at p. 57, para. 206.

hibited by international law and are widely used in the operation of nuclear land-based installations, space objects and nuclear ships, damage caused by these installations can easily affect the environment of the global commons.

Nevertheless, the ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities adopted in 2001 refer to the duty of States to protect the environment with a reference to the Rio Declaration on the Environment and Development and to the importance of international cooperation amongst States.[96] Similarly, the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities refer to Principles 13 and 16 of the Rio Declaration on the Environment and Development.[97] According to Principle 13, the States should develop national law of liability and compensation for environmental damage and to cooperate in the development of international law of liability and compensation for environmental damage caused by activities carried out within their jurisdiction or control to areas beyond their jurisdiction. Also, according to Principle 16, national authorities should develop the internalization of environmental costs based on the polluter pays principle that obliges the polluter to bear the costs of pollution. Moreover, as mentioned, the principles define the concept of environmental damage and the environment.[98] According to the principles, also the States should protect and preserve the environment, as well as to ensure compensation to victims of environmental damage and restore the impaired environment.[99]

8.3.1.2 The general principle of strict State liability

Furthermore, initially there was some debate within the ILC about adapting the concept of strict liability to liability for environmental damage caused by hazardous activities. However, the ILC's position on the application of the principle of strict liability was not clear.[100] It was not clear whether the Commission was rejecting the principle of strict liability itself as the basis of liability for hazardous activities or whether it was rejecting the application of the principle only to State liability for damage caused by such activities. It refers to international liability for hazardous activities not prohibited under

[96] The Preamble of the 2001 ILC Draft Articles on Prevention of Harm.
[97] The Preamble of the 2006 ILC Draft Principles on the Allocation of Loss.
[98] Principle 2 of the 2006 ILC Draft Principles on the Allocation of Loss.
[99] Principle 3 of the 2006 ILC Draft Principles on the Allocation of Loss.
[100] For the debate on the question of strict liability on the ILC draft Articles, see O'Keefe, DJILP, Vol. 18, No. 2, 1990, at pp. 178-185; Julio Barboza, "Second Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law", UN Doc. A/CN.4/402, YILC, 1986, Vol. II, Part One, at pp. 155-160, paras. 46-63.

international law without explicit reference to a particular basis for the liability. Despite the fact that liability for damage caused by hazardous activities is based under the general rules of international law on risk or absolute liability, neither the title chosen by the Commission for the topic (International Liability for Injurious Consequences Arising out of Acts Not Prohibited by International Law) or any other subsequent titles of topics refers to risk liability as a basis of State liability for damage caused by hazardous activities as in the case of the ILC Draft Articles on State Responsibility for Wrongful Acts. Moreover, the Commission did not adopt a general principle of strict liability in the Draft Articles that indicates the basis of international liability for hazardous activities as in the case of the ILC Draft Articles on State Responsibility for Wrongful Acts.[101] The adoption of such a principle is important to remove the ambiguity in relation to the application of risk liability for damage caused by hazardous activities in general and nuclear energy in particular. As Birnie and Boyle argued:

> '[T]he successful articulation of criteria for adopting a general principle of strict liability applicable to cases of environmental harm would be an invaluable contribution to the subject, as the uncertainty regarding responsibility for the Chernobyl nuclear accident shows. If the Commission can secure international support for this proposition it will have achieved a significant advance and will have provided a useful element of flexibility in the wider balancing of interests which the Commission's articles as a whole seek to establish in transboundary relations'.[102]

The application of strict liability in international liability was also supported by the Special Rapporteur Baxter who emphasized that the concept of strict liability was the basis of liability for damage caused by hazardous activities. He stated:

> 'At the very end of the day, when all the opportunities of regime-building have been set aside – or, alternatively, when a loss or injury has occurred that nobody foresaw – there is a commitment, in the nature of strict liability, to make good the loss. The Special Rapporteur finds it hard to see how it could be otherwise, taking into account the realities of transboundary dangers and relations between States, and the existing elements of a developing chapter of international law'.[103]

The concept of strict liability as suggested by Baxter was discussed by the Commission. However, it was rejected by some members of the Commission

[101] Article 1 of the 2001 ILC Draft Articles on State Responsibility.
[102] Birnie and Boyle, 2002, at p. 190.
[103] YILC, 1982, Vol. II, Part One, at p. 60, para. 41.

on the basis that the concept of strict liability is derived from domestic law and they considered that it is contrary to the concept of strict liability in international law.[104] According to this view, the concept of strict liability in domestic law is aimed only at reparation of the damage, while the concept of strict liability in international law as presented in the topic is aimed at the prevention and reparation of environmental damage.[105] However, in support of his view, Baxter stated that borrowing the concept of strict liability from domestic law does not mean that it has the same significance and content in international law. It only uses the concept of "strict liability" which is a common principle to base the liability of a State on the proof of causality, i.e., the causal relationship between transboundary environmental damage and a hazardous activity.[106] He stated that there is

> '[…] no contradiction between the principle of strict liability and prevention. One of the latent purposes of strict liability was prevention, to discourage the author from conducting certain activities or from doing so in certain ways by imposing direct and strict liability for compensation. He believed that that concept constituted an important principle of the present topic. Strict liability did not need to be incorporated in the present topic to the same degree as was known in domestic law or under some conventional regimes of international law; but what was important was the notion that the establishment of a causal relationship between certain activities and certain injury was sufficient to entail liability. Strict liability provided that basis'.[107]

Baxter also considered that strict liability is optional and relied on the negotiations between the source State and the affected State to establish the balance of interests and equity through liability and compensation.[108] He observed that:

> '[A]t the end of the journey, the monster of strict liability should be domesticated. In a conventional regime, strict liability is a commutation of an obligation of prevention, and usually – as with the Trail Smelter company – it represents a cost that the enterprise would gladly underwrite in perpetuity, rather than embark upon major schemes of prevention. In customary law, when wrongfulness is precluded or responsibility is not engaged, the acceptance in

[104] YILC, 1987, Vol. II, Part Two, at p. 48, para. 183.
[105] YILC, 1987, Vol. II, Part Two, at p. 48, para. 184.
[106] YILC, 1987, Vol. II, Part Two, at p. 48, para. 186.
[107] YILC, 1987, Vol. II, Part Two, at p. 48, para. 186.
[108] First report on the legal regime for allocation of loss in the case of transboundary harm arising out of hazardous activities by Mr. Pemmaraju Sreenivasa Rao, Special Rapporteur, International Law Commission, Fifty-fifth session, Geneva, 5 May-6 June and 7 July-8 August 2003, UN Doc. A/CN.4/531, at p. 11, para. 20, available at: http://untreaty.un.org/ilc/documentation/english/a_cn4_531.pdf (accessed on 22.4.2012).

> principle of a rule that does not penalize the innocent victim is a matter about which governments could form a view when this topic [… has advanced] a few years […]. In any case, such a liability would be subject to equities; so the victim […] must really be an innocent victim'.[109]

Accordingly, Baxter did not fully support the application of the principle of strict liability to the liability of the State and supported it only in relation to its application in civil liability regimes. In addition, there were divergent opinions among the members of the Commission about accepting the concept of strict liability as a basis of State liability and reparation for environmental damage caused by hazardous activities.[110] They were in favour of the application of international conventions to impose strict liability upon the operator of the activity.[111]

Unlike Baxter, the Special Rapporteur Barboza considered that strict liability is the main basis of international liability and reparation for damage related to nuclear and other hazardous activities.[112] In support of the application of strict liability on the topic of International Liability for Injurious Consequences Arising out of Acts Not Prohibited by International Law he stated:

> 'As to the basis for the obligation, the Special Rapporteur considered that a clarification should be made: it was not logical to base the obligation of reparation both on its identity with prevention and on strict liability. Although there had been objections to strict liability, it had been stated in support of it, first, that it was not a monolithic concept, since it involved different degrees of strictness, and, when combined with the above-mentioned mitigating factors, became a sufficiently flexible instrument; and, secondly, that it was not certain that it did not have a basis in international law. Failure to provide compensation for transboundary injury caused by a hazardous activity in the territory of a State could be based only on a theory of sovereignty which did not take account of the interdependence that was becoming more and more characteristic

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[109] YILC, 1981, Vol. II, Part One, p. 123, para. 92.

[110] YILC, 1986, Vol. II, Part Two, at pp. 58-59, para. 217; Lammers, EPL, Vol. 31, Issue, 1, 2001, at p. 47; Lammers, HYIL, Vol. 19, 2006, at p. 92; Pemmaraju Sreenivasa Rao, Special Rapporteur, "Third Report on the Regime for the Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities", ILC, Fifty-eighth session, Geneva, I May to 9 June and 3 July to 11 August 2006, UN Doc. A/CN.4/566 (2006), at p. 22, para. 31, available at: http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N06/262/01/PDF/N0626201.pdf?OpenElement (accessed on 22.4.2012).

[111] Kiss & Shelton, in: Ndiaye and Wolfrum (eds.), 2007, pp. 1131-1151, at p. 1140, also available at: http://ssrn.com/abstract=1010478 (accessed on 8.3.2011).

[112] YILC, 1986, Vol. II, Part Two, at p. 56, para. 197-198.

> of international life and which would be contrary to the principle of the sovereign equality of States because it would overlook the other aspect of State sovereignty, namely that every State was entitled to use its own territory without any outside interference'.[113]

However, it was difficult for Barboza to convince the Commission of his view that a general principle of strict liability should be introduced in the Articles because it had been rejected by many governments.[114] He also attracted criticism because he extended the scope of international liability for lawful activities not prohibited by international law to cover liability for low-risk activities which require a different solution. These low-risk hazardous activities have no direct environmental impact on other States during normal operation, but only have an effect when an accident occurs. It also covers liability for hazardous activities which have a long-range effect on the environment of other States, even during normal operation, such as nuclear energy.[115] In addition, he introduced in the Articles numerous primary obligations necessary for the prevention and reduction of environmental damage caused by nuclear and other hazardous activities. These obligations were the core of the topic. The fulfilment of these obligations requires the application of wrongful act responsibility rather than strict or absolute liability.[116] The breach of international obligations can be treated together with State responsibility without the need to develop new Draft Articles. At the same time, the Commission failed to deal with the question of international liability for hazardous activities because it is difficult to prove the fault or negligence of the operator of the activity or to incur State responsibility once the State has met its due diligence obligation. This made the topic very complicated. Therefore in 1997, the Commission separated the question of prevention from the topic of international liability for damage caused by lawful activities and concentrated only on codifying it. This codification was completed in 2001. This was the real problem confronting the Commission. Later it examined the second part of the question of international liability for hazardous activities which focused on civil liability.

Finally, the issue of strict State liability was discussed by the Commission during the codification of the Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities. However, some governments refused to accept strict liability of the State for environmental damage caused by hazardous activities. As the Special Rap-

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[113] YILC, 1986, Vol. II, Part Two, at p. 56, para. 199.
[114] YILC 1988, Vol. II, Part Two, at p. 21, para. 98.
[115] P. Sturma, "Some Problems of Strict Liability in International Law", in: TA, Vol. XX, 1993, pp. 369-381, at p. 379.
[116] Birnie and Boyle, 2002, at p. 190.

porteur Rao stated: 'The hesitation to peg State liability to strict liability is also understandable. It is mainly due to an assessment that in international practice, as between States, that form of liability is not accepted for activities that are considered as lawful to pursue in their domestic jurisdiction in accordance with their sovereign rights'.[117] The Commission later focused on the codification of the topic of civil liability which imposes strict liability on the operator of a hazardous activity on the basis of international agreements and excludes strict liability of the State as a subject of international law. Accordingly, the 2006 ILC Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities apply strict State liability in the case of a nuclear accident when the State serves as an operator of a nuclear activity, for example, when a State is not party to the nuclear liability conventions. Strict liability applies for the State when it carries out a nuclear activity as an operator with civil liability. The ILC selected a model of a strict liability regime similar to those which apply in other civil liability regimes, including oil, pollution, environmental damage and nuclear activity regimes based on international agreements.[118] As liability for environmental damage caused by nuclear activities as hazardous activities has been based on civil liability according to the ILC, this chapter continues to examine these issues of strict liability under the general rules of international law, including nuclear conventions and other agreements that cover civil and State liability. This may reveal whether there is a general principle in international law on the liability of the operator and the State for environmental damage caused by a nuclear accident.

8.3.2 Conventions on strict State liability

The principle of strict State liability for environmental damage caused by nuclear activities has been acknowledged by several international instruments. Most of these are mainly restricted to outer space instruments. They apply the concept of strict State liability for environmental damage caused by the use of nuclear energy for peaceful purposes. For example, the principle is reflected in a number of resolutions of the UN General Assembly related to damage caused by space objects. These resolutions provide for State responsibility to fulfil certain obligations to ensure that no environmental damage is

[117] First report on the legal regime for allocation of loss by Rao, UN Doc. A/CN.4/531, at p. 12, para. 22, also see p. 4, para. 3; Boyle, JEL, Vol. 17, No. 1, pp. 3-26, 2005, at p. 6; Faure & Nollkaemper, 2007, at p.146, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1086281 (accessed 2.4.2011).

[118] For the development of the work of the ILC on this issue, see Birnie, Boyle and Redgwell, 2009, at pp. 223-224; Sands, 2003, at pp. 910-904.

caused to outer space by space objects and for liability for damage caused by the use of nuclear energy in outer space.[119]

The principle was also included in Article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.[120] This Treaty provides that '[e]ach State Party to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, is internationally liable for damage to another State Party to the treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the moon and other celestial bodies'.[121] This provision is indirectly an application of the principle of strict liability under which the State is liable to compensate the injured parties for environmental damage caused by space activities carried out in outer space. However, this Treaty has become less important in relation to State liability for environmental damage caused by space objects

[119] See, for example, the UNGA resolution No. 1962 (XVIII) on the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space. Paragraph 5 of this resolution provides that '5. States bear international responsibility for national activities in outer space, whether carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried on in conformity with the principles set forth in the present Declaration. The activities of non-governmental entities in outer space shall require authorization and continuing supervision by the State concerned. When activities are carried on in outer space by an international organization responsibilities for compliance with the principles set forth in this Declaration shall be borne by the international organization and by the States participating in it'; the UNGA Resolution No. 37/92 on Principles Governing the Use by Artificial Earth Satellites for International Direct Television Broadcasting, adopted by the UNGA at its 100th plenary meeting on 10 December 1982. This resolution has an annex that provides in paragraph 8 for the responsibility of the State: '8. States should bear international responsibility for activities in the field of international direct television broadcasting by satellite carried out by them or under their jurisdiction and for the conforming of any such activities with the principles set forth in this document'; the UNGA Resolution No. 45/55 on Prevention of an Arms Race in Outer Space, adopted by the UNGA at its 54th plenary meeting on 4 December 1990; the UNGA resolution No. 47/68 on Principles Relevant to the Use of Nuclear Power Sources in Outer Space, adopted by the UNGA at its 85th plenary meeting, 14 December 1992. Principles 8 and 9 of this resolution provide for the liability and compensation of the State for injuries caused by the use of nuclear power sources in outer space.

[120] The Treaty was adopted and opened for signature in Moscow, London and Washington, on 27 January 1967 and came into force on 10 October 1967. See UNTS, Vol. 610, p. 206. Also see the Treaty in the Annex to UNGA Res. 2222 (XXI), 1499th plenary meeting, 19 December 1966.

[121] Article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

since the adoption of the 1972 Convention on International Liability for Damage Caused by Space Objects.[122]

This Convention provides directly for the absolute liability of the State for damage caused by space objects. It is not an independent instrument for State liability, but like the nuclear liability conventions, it covers environmental and non-environmental damage caused by a space object, including environmental nuclear damage.[123] It covers nuclear damage when a space object is operated by a nuclear reactor or a nuclear-powered source. The Convention was developed in response to 'the common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes' [… and the protection from] 'damage may on occasion be caused by such objects'. [… and for] 'the need to elaborate effective international rules and procedures concerning liability for damage caused by space objects and to ensure, in particular, the prompt payment under the terms of this Convention of a full and equitable measure of compensation to victims of such damage'.[124] This Convention imposes absolute liability on the launching State to compensate damage caused by its space object on the surface of the earth or

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[122] Gehring and Jachtenfuchs, EJIL, Vol. 4, Issue 1, 1993, at p. 103. For the text of the Convention, see 10 ILM 1971, p. 965; UNTS, Vol. 961, p. 187; AJIL, 1972, Vol. 66, at p. 702. The Convention reproduced in Hurwitz, 1992, pp. 211-219; Elbaradei, Nwogugu and Rames, 1993, at p. 1301. The Convention entered into force on 1 September 1972. For references to these conventions, see Shang Kuan, "Legality of the Development of Anti-Satellite Weapons in Earth Orbit: Present and Future", in: JSL, Vol. 36, No. 1, 2010, pp. 207-230; Dimitri Maniatis, "The Law Governing Liability for Damage Caused by Space Objects: from State Responsibility to Private Liability", in: AASL, Vol. 22, Issue 1, 1997, pp. 369-401; Nicholas D. Welly, "Enlightened State-Interest: A Legal Framework for Protecting the 'Common Interest of All Mankind' from Hardinian Tragedy", in: JSL, Vol. 36, No. 1, 2010, pp. 273-313;

, in: AFDDI, Vol. 55, 2009, pp. 615-626; Fabio Tronchetti, "The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies", in: JSL, Vol. 36, No. 2, 2010, pp. 489-524; Jinyuan Su, "Use of Outer Space for Peaceful Purposes: Non-Militarization, Non-Aggression", in: JSL, Vol. 36, No. 1, 2010, pp. 253-272; Zach Meyer, "Private Commercialization of Space in An International Regime: A Proposal for a Space District", in: NJILB, Vol. 30, No. 1, 2010, pp. 241-261; Manfred Lachs, "The Law of Space; An Experience in Contemporary Law-making", edited by Tanja Masson-Zwaan, Stephan Hobe, Manfred / Martinus Nijhoff, Leiden, 2010; Armel Kerrest, "Liability for Damage Caused by Space Activities", in: Marietta Benko and Kai-Uwe Schrogl (eds.), Space Law : Current Problems and Perspectives for Future Regulation, Eleven International Publishing, Utrecht, 2005, pp. 91-111.

[123] Gehring and Jachtenfuchs, EJIL, Vol. 4, Issue 1, 1993, at p. 103.

[124] The Preamble of the 1972 Convention on Space Objects.

to aircraft in flight.[125] The principle of absolute liability has been adopted in this Convention to avoid the extreme difficulties which face the victims in proving fault or negligence of the State or the organization launching a space object into space.[126] However, in exceptional cases, as mentioned above, liability for damage caused by space objects under this Convention is also based on fault liability. The Convention applies fault liability where damage is caused, somewhere other than on the surface of the earth, to a space object of a launching State or to persons or property on board such a space object by a space object of another launching State, which should be liable only if such damage is caused as a result of its fault or the fault of the persons for whom it is responsible.[127] The Convention applies the principle of joint and several liability in the case of the application of absolute or fault liability where damage is caused by a space object on board a space object launched by another State and causes damage to a third State.[128] It also applies the principle of joint and several liability where liability for damage is caused by a space object launched jointly by more than one State.[129] Finally, despite the fact that the liability of the State under the Convention is absolute, it provides for some exemptions from liability.[130] It exonerates the launching State of a space object from liability where the damage caused is wholly or partially the result of gross negligence or an act or omission where there was an intent to cause damage on the part of a claimant State or its representative, judicial or natural persons. However, these exonerations do not apply in cases where the damage is caused by activities carried out by the launching State in violation of international law, particularly the Charter of the United Nations and the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.[131] The Convention also gives the injured party the right to choose whether to claim for compensation before national or international courts.[132] Nevertheless, the Convention has some shortcomings, e.g., 'the

[125] Article II of the 1972 Space Liability Convention; Lachs, 1991, at p. 965.
[126] Aréchaga and Tanzi, 1991, at p. 351.
[127] Article III of the 1972 Space Liability Convention.
[128] Article IV of the 1972 Space Liability Convention.
[129] Article V of the 1972 Space Liability Convention.
[130] Exoneration from liability, see Jocben Pfeifer, "International Liability for Damage Caused by Space Objects", in: ZFLW (GJASL), Vol. 30, 1981, pp. 215-257, at p. 231.
[131] Article VI of the 1972 Space Liability Convention.
[132] ILC Secretariat Survey, A/CN.4/471, 1995, at p. 32.

absence of a meaningful provision for general problems' arising out of damage caused to the environment of space.[133]

The provisions of the Outer Space Treaty and the 1972 Space Objects Liability Convention in relation to State liability and responsibility in outer space reflected in the UN Principles Relevant to the Use of Nuclear Power Sources in Outer Space. These principles provide for the liability of the State launching a space object for damage caused by such an object.[134]

Finally, according to the Institute of International Law, the Draft Articles on Responsibility and Liability under International Law for Environmental Damage of 1997 state that strict liability is the most appropriate basis for the liability of the State for damage caused by hazardous activities and also for the liability of the operator of the activity.[135]

8.3.3 General principles of law

The principle of strict liability as a general principle of law is derived from the *Rylands v. Fletcher* case. According to the British House of Lords decision of 1868 (L.R. 3 HL., 330), a person who carried out an abnormal activity or accumulates dangerous things which may cause harm to his neighbours should be held strictly liable for direct damage caused by the activity or the thing even if he has taken all possible care to prevent the damage.[136] This decision provides that 'a person who for his own purposes brings on his land and collects and keeps there anything likely to do mischief if it escapes, must keep it in at his peril, and, if he does not do so is *prima facie* answerable for all damage which is the natural consequence of its escape'.[137] This decision was the first legal precedent in the history of the modern legal systems of liability which imposes strict liability for damage caused by ultra-hazardous activities. It was followed by the courts of England and other countries that apply legal precedents, as judicial precedents or arbitral awards are applied by English law. Hundreds of decisions were carried out by the English courts on the

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[133] Carl Q. Christol, "International Liability for Damage Caused by Space Objects", in: AJIL, Vol. 74, No. 2, pp. 346-371, 1980, at pp. 368-369.

[134] Principle 9 related to liability and compensation.

[135] See Articles 4 and 5 of the 1997 Draft Articles on "Responsibility and Liability under International Law for Environmental Damage" adopted by the Institute of International Law in Session of Strasbourg in 1997, available at: http://www.idi-iil.org/idiE/resolutionsE/1997_str_03_en.PDF (accessed on 27.4.2012).

[136] Roushdy, JILE, Vol. 10, 1975, at p. 173-174.

[137] As quoted from Marika Natasha Taishoff, "State Responsibility and the Direct Broadcast Satellite", Frances Pinter (Publishers), London, New York, 1987, at p. 57; Fletcher v. Rylands, Law Reports, 1 Exchequer (1866), pp. 265 and 279-280, cited in ILC Secretariat Survey, 1985, at p. 225.

basis of this decision. They applied strict liability to damage caused by abnormal activities and things, etc.[138] In common law, judicial precedent is the main source of law. The earlier decisions pronounced by the courts in the countries which apply judicial decisions and awards had an effect in other courts which followed these decisions. The decisions may involve international legal principles where they are incorporated in municipal legal systems.[139] These principles become binding for the courts of these countries[140]and may, in one way or another, pass into international law.[141]

The principle of strict liability has been accepted in general by States to govern liability for damage caused by some activities and in particular by ultra-hazardous activities. National legal systems have increasingly relied on the principle of strict liability to regulate liability for damage caused by ultra-hazardous activities.[142] In modern liability law systems, the origin of strict liability is applied by the common and civil law of the civilized countries, including European and other countries.[143] A strict liability standard is applied by the modern national legislations of the Anglo-American, Latin law and socialist systems in many States. This was recognized in the Civil Codes, nuclear liability legislation and other liability legislation which govern liability for damage caused by hazardous activities.[144] For example, it

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[138] ILC Secretariat, Survey, 1985, at p. 225.

[139] For the relationship between international and municipal law, see Fernando R. Tesón, "The Relations between International Law and Municipal Law: The Monism/Dualism Controversy", in: Michael Bothe and Raul E. Vinuesa (eds.) International Law and Municipal Law, Droit international et droit interne, Völkerrecht und Landesrecht, Derecho internacional y derecho interno, Duncker & Humbot/Berlin, 1982, pp. 107-116.

[140] L. Erades, "Is *Stare Decisis* an Impediment to the Enforcement of International Law by British Courts?" in: NYIL, Vol. 4, 1973, pp. 105-116, at p. 106.

[141] It should be noted that some jurists doubt that these principles are binding as principles of civilized nations in international law. Erades, quoted by D. P. O'Connell, International Law, 2nd ed. (London-Dobbs Ferry, NY, 1970), p. 58, as early as 1915 Sir Samuel said that '[i]n the domain of international law, in particular, there is room for the extension of old doctrine or the development of new principle, where there is, or is even likely to be, a general acceptance of such by civilized nations. Precedents handed down from earlier days should be treated as guides to lead, and not as shackles to bind. But the guides must be lightly deserted'. Erades, NYIL, Vol. 4, 1973, at p. 112.

[142] Hardy, ICLQ, Vol. 10, 1961, at p. 758.

[143] See the study on "Unification of Tort Law". This study included several European and non-European countries including Austria, Belgium, Czech Republic, England, France, Germany, Greece, Israel, Italy, Netherlands, Poland, South Africa, Spain, Switzerland and the United States. Koch and Koziol (eds.), 2002.

[144] These principles may be extended to apply in the national legal systems of other nations, particularly the developing countries. It is known that many colonial States imposed their national laws on the colonized States during the era of colonization. Some of

was adopted by the law of the German Democratic Republic,[145] Egypt,[146] Sudan, Iraq, Mexico, Austria, France,[147] the Soviet Union[148] and Poland.[149] The legislation of these countries applies in the case of environmental damage caused by nuclear activities where there is no environmental convention, or nuclear legislation has been adopted by the State. When nuclear energy was first used, the significance of the general principles of law on strict li-

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the colonized countries continued to apply these laws even after independence and some made only a few modifications to bring them into line with the culture of their countries. For instance, the Egyptian and the Algerian national law were derived from French law, etc.

[145] There is no general rule under the German Civil Code (Bürgerliches Gesetzbuch "BGB") that imposes strict liability on the operator of an ultra-hazardous activity or object. According to Article 823 of the BGB, liability for torts is based on fault. However, strict liability for ultra-hazardous activities is imposed on the operator of the activity by special legislation. Lammers, 1984, at pp. 644-645. Section 823 of the German Civil Code related to liability for damages provides that, '(1) A person who, intentionally or negligently, unlawfully injures the life, body, health, freedom, property or another right of another person is liable to make compensation to the other party for the damage arising from this.
(2) The same duty is held by a person who commits a breach of a statute that is intended to protect another person. If, according to the contents of the statute, it may also be breached without fault, then liability for compensation only exists in the case of fault'. German Civil Code in the version promulgated on 2 January 2002 (Federal Law Gazette [Bundesgesetzblatt] I p. 42, 2909; 2003 I, p. 738), last amended by statute of 28 September 2009 I 3161, available at: http://www.gesetze-im-internet.de/englisch_bgb/englisch_bgb.html#p3312 (accessed on 13.11.2011).

[146] Article 178 of the Egyptian Civil Code also included risk liability of the guardian of the things without the need to prove fault on his part, unless the damage was caused by force majeure or extraneous matters out of his control.

[147] The Civil Code of the French law recognizes strict liability as a basis of liability (Article 1384 CC of the French Civil Code). The French Court of Cassation in its judgment on 16 June of 1896 recognized the principle of absolute liability.

[148] According to Article 78 of Soviet air law, the operator is liable for death or loss or damage caused to persons or property, unless the damage is caused by intention or gross negligence on the part of the injured person. As in the German Civil Code, tort liability under USSR Civil Liability Code is based on fault, while liability for damage caused by ultra-hazardous activities is based on special legislation. This legislation is the so-called "source of increased danger". According to Article 454 of this legislation, the operator or the possessor of an activity which might involve danger is liable to repair damage caused by such activity, unless the victims of the damage have taken part in causing such damage. Lammers, 1984, at p. 646. See also, Okowa, 2000, at p. 119; Article 454 of the 1964 Civil Code of the Soviet Union; Article 450 of the Ukrainian Civil Code, in the Civil Code of the Ukrainian SSR.

[149] Most of this legislation has been amended, perhaps one or more times, but these amendments provide for the same principles.

ability as adopted by the doctrine of *Rylands v. Fletcher* was realised for the application in cases in which the State is not party to any nuclear liability convention and has no nuclear liability legislation to govern liability for nuclear damage caused by a nuclear activity.[150] At present, the principle of strict liability has been given a broader scope of application in various fields in these countries. For instance, in the Austrian national system strict liability was adopted in many laws related to dangerous and other activities, such as motor vehicles, railways, aeroplanes, electricity and gas installations, installations emitting pollution, product liability, media, computer and other activities.[151]

Moreover, the principle of strict liability can also be imposed by national courts whether or not it is proved that the defendant took all reasonable care.[152] Austrian law gives judges the flexibility to develop a standard of strict liability by making analogies with other activities for which strict liability applies. In other cases judges do not create a standard of strict liability, but they ease the burden of proof of liability which is considered as a kind of application of strict liability.[153] However, the number of activities subject to strict liability may differ from country to country. The application of the principle of strict liability is more limited in the legal liability systems of some countries than it is in others, but the understanding, application and formulation of the principle is substantially similar.[154]

> 'However, there are significant differences in the scope of strict liability in national law. For example, in French law strict liability is an accepted principle of governmental liability, while in England activities conducted by public bodies under statutory authority are usually excluded from *Rylands v Fletcher*. English common law also excludes from its rules on strict liability damage which could not reasonably have been foreseen, thus significantly limiting the utility of no-fault liability in cases of historic pollution damage'.[155]

The principle of strict liability as a general principle of law is considered to be one of the principles of law of the civilised nations as recognized by Article 38 of the ICJ Statute.[156] The implementation of strict liability by the na-

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[150] Hardy, BYIL, Vol. 36, 1960, at p. 232.
[151] Bernhard A. Koch and Helmut Koziol, "Austria", in: Koch and Koziol, 2002, pp. 9-41, at pp. 13-14.
[152] Hardy, BYIL, Vol. 36, 1960, at p. 226.
[153] Bernhard A. Koch and Helmut Koziol, "Austria", in: Koch and Koziol, 2002, at p. 14.
[154] ILC Secretariat, Survey, 1985, at p. 233.
[155] Brinie and Boyle, 2002, at p. 187; Brinie, Boyle and Redgwell, 2009, at p. 219.
[156] See Second report on the legal regime for the allocation of loss in case of transboundary harm arising out of hazardous activities by Pemmaraju Sreenivasa Rao, Special Rapporteur, UN General Assembly doc. A/CN.4/540, 15 March 2004, at p. 26.

tional legal systems of civilized nations is considered to be an implementation of international legal principles as provided for in Article 38 (1) (c) of the ICJ Statute.[157] This gives the principle significant weight as a legal principle of the civilized nations, as recognized by Article 38 (1) (c) of the ICJ Statute which is one of the principles that is endorsed by many writers of nuclear liability law.

> '[T]he widespread practice may be cited as evidence of a "general principle of law" recognized by civilized nations within the meaning of Article 38 (1) (c) of the International Court's Statute. It may be argued on the basis of this widespread practice, that the imposition of a higher standard of conduct in respect of activities involving a high degree of risk is part of general international law.
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> No doubt the imposition of strict liability is partly designed to meet the requirements of domestic insurance, but this should not detract from the fact that the overriding consideration is to improve the safety of dangerous activities, and to insulate the rest of society from risks inherent in the activity. Nevertheless, caution is required since there is evidence to suggest that many states, whilst favouring the imposition of strict liability on the operators of nuclear reactors, are reluctant to accept a similar principle in the context of inter-state claims'.[158]

In conclusion, strict liability as a legal basis of liability for environmental damage caused by nuclear activities as ultra-hazardous activities has been applied, as we will see below, in many national nuclear laws of the civilized and non-civilized nations. The wide recognition of the principle in national law increases the support of the principle in state practice with regard to its application to liability for damage caused by nuclear activities.[159] The principle of strict liability is one of the legal principles of international law recognized by the civilized nations in accordance with the provisions of Article 38 (1) (c) of the ICJ Statute, which considers the general principles of the laws of civilized nations as principles of international law. Accordingly, a person who engages in an abnormal activity such as a nuclear activity is held

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[157] Fadel, 1976, at pp. 320-321.

[158] Okowa, 2000, at pp. 119-120. Also see Measures to Strengthen International Co-operation in Nuclear Safety and Radiological Protection: Liability for Nuclear Damage, Draft resolution recommended by the Committee of the Whole, IAEA General Conference, Thirty-second regular session, Agenda item 10(GC(XXXII)/856, GC(XXXII)/869, 22 September 1988, available at: http://www.iaea.org/About/Policy/GC/GC32/GC32Documents/English/gc32-869_en.pdf (accessed on 29.4.2012); Report of the Working Group held on 9-10 April SCNL/3/INF.2/Rev.1, Annex II; YILC, 1987, Vol. II, Part Two, at p. 48, para. 186.

[159] Okowa, 2000, at p. 119.

liable for environmental damage caused by such an activity even if he has taken all possible care to prevent the damage.

8.3.4 Doctrinal position and customary environmental international law principles

The doctrine of international law is still divided about accepting a general principle of customary international law for strict State liability for damage caused by nuclear installations,[160] as well as in general. There are several different views on this issue which are reflected in the application of the principle to nuclear damage caused by nuclear accidents. The first argument completely rejects strict liability as a general principle of customary international law as the basis of liability for damage caused by ultra-hazardous activities.[161] This argument was supported by the doctrine of Oppenheim, Fauchille, Lauterpacht and others.[162] It considers fault liability or wrongful act responsibility to be the only fundamental principle that is applicable to damage caused by lawful and unlawful activities.[163] It was argued that the concept of strict liability remains vague and has no clear application in practice.[164] Furthermore, in practice some States such as Germany and Austria interpret the provisions of fault liability as having a similar function to strict liability.[165] Accordingly, environmental damage caused by a nuclear accident can only repaired by the State if it was at fault or committed a wrongful act which caused the damage. This view does not correspond with liability for environmental damage caused by nuclear energy as it is difficult to prove the fault on the part of the State, and in some cases wrongful act responsibility cannot be established where the State has met standards of due diligence or there is some exoneration from responsibility. In that case, the innocent victims of a nuclear accident will bear the damage and loss themselves.

The second argument rejects strict liability as a legal principle of liability under international law where wrongful act responsibility is applicable.

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[160] Jenks, RDC, Vol. 117, Part I, 1966, at p. 194; Handl, CYIL, Vol. 21, 1983, at pp. 97-98; Koen Lenaerts, "Border Installations", in: Cameron, Hancher and Kühn (eds.), 1988, pp. 49-82, at p. 82; ICJ Reports, 1949, at p. 65. Dissenting Opinion by Judge Badawi Pasha in the Corfu Channel; Jennings and Watts (eds.), 1996, at p. 509.

[161] See Jennings and Watts (eds.), 1996, at p. 511.

[162] See Sturma, TA, Vol. XX, 1993), pp. 369-381; Smith, 1988, at p. 118; Judge Badawi Pasha, ICJ Reports, 1949, at pp. 65; Graefrath, RDC, Vol. 185, Part II, 1984, at pp. 110-113.

[163] Bannona, 1971, at p. 75.

[164] Sturma, TA, Vol. XX, 1993, at p. 372.

[165] Reinhard, H. Ganten, "Law on Liability for Environmental Damage-A Model for Europe?" in: ELP, Vol. 18, No. 3, 1988, pp. 83-88, at p. 84.

Wrongful act responsibility applies where constituent elements have been proved, even if the elements of strict liability are identified.[166] Accordingly, strict liability is applicable to environmental damage caused by a nuclear accident only in exceptional cases, in the absence of wrongful liability. Responsibility for an unlawful act should be applied first because this was established for the performance of a hazardous activity.[167]

The third argument accepts the concept of strict liability where it is included in an international convention which determines the circumstances and conditions of its application.[168] Thus this argument rejects strict liability as a general principle of liability under international law. This is because '[… i]n accordance with this view, they of course found it difficult to draft a general regime of liability in the absence of a solid basis in general international law'.[169] This argument is also questionable because it restricts the application of the concept of strict liability of a State for environmental damage caused by a nuclear accident to the existing conventions governing State liability. The only convention to clearly apply State liability for environmental damage caused by nuclear activities is the 1972 Space Liability Convention, while other conventions which govern the liability for environmental damage by hazardous activities govern the civil liability of the operator of a nuclear installation.

The fourth argument argues for a general principle of strict liability in international law independent of wrongful act responsibility and other principles of international law.[170] This approach was supported by some scholars, including Goldie[171] and Schneider.[172] However, it was also criticized. It was stated that it derived its evidence from national law and that there is no clear support in international case law for the introduction of a general principle of strict liability.[173]

The fifth argument recognizes that strict liability is a general principle in international law, but it only applies to liability for damage caused by haz-

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[166] Fadel, 1976, at p. 314.
[167] Aréchaga, and Tanzi, 1991, at p. 351.
[168] Aréchaga, RDC, Vol. 159, No. I, 1978, at p. 271; Aréchaga, and Tanzi, 1991, at p. 351; Barros, CJTL, Vol. 25, 1987, at p. 660; Lammers, EPL, 31/2 (2001), at p. 100; YILC, 1987, Vol. II, Part Two, at p. 42, para. 139.
[169] YILC, 1987, Vol. II, Part Two, at p. 42, para. 138.
[170] See, Birnie, Boyle and Redgwell, 2009, at p. 218; Birnie and Boyle, 1992, at p. 140.
[171] Goldie, ICLQ, Vol. 14, 1965, at p. 1189.
[172] Boyle, BYIL, Vol. 60, 1989, at p. 190. For strict liability as a principle of international law according to Article 38 (1) (c) of the ICJ Statute, see Kelson, HILJ, Vol. 13, 1972, at p. 201.
[173] Boyle, BYIL, Vol. 60, 1989, at p. 191.

ardous activities.[174] According to this argument, strict liability as a general principle of international law applies as an exceptional principle to damage caused by ultra-hazardous activities. Beyond that, strict liability is questionable. This argument is appropriate for liability for environmental damage caused by nuclear activities and does not allow the State to escape its responsibility.[175]

Finally, it was argued that the State must ensure that no environmental damage is caused by hazardous activities carried out within its territory or under its jurisdiction or control on the basis of the absolute liability of the State and not on the basis of due diligence. This was justified by the fact that the actual damage is caused by an activity under the jurisdiction of a State which has a duty not to cause damage to the environment of other States. This view does not reject the concept of strict liability of a State for environmental damage based on the actual damage, but it rejects it as a general principle of international law.[176] It seems that this view is consistent with the theory of wrongful act responsibility. The violation of the obligation of a State not to cause damage to another State constitutes wrongful act liability rather than strict liability. It is also consistent with the doctrine of natural law.

In my opinion, the development of the basis of liability in the ancient societies illustrates that the root of strict liability under customary international law was derived from natural law.[177] There is a natural obligation upon the State or operator of the activity to compensate damage caused by this activity which is imposed by the nature of things. This natural obligation is a primary obligation. It is imposed upon any person, individual or State owning or operating a hazardous activity in order to prevent other from being harmed by such activity. This was clearly illustrated by the doctrine of Grotius, who based sources of international law on the concept of natural law. As Mohmassani pointed out:

> 'He [Grotius] based international law both on natural law and on positive law. According to the Grotian system, states, besides being subject to the law of na-

[174] Jenks, RDC, Vol. 117, Part I, 1966, at p. 178; Amer, 1981/1982, at p. 46.
[175] Boyle, BYIL, Vol. 60, 1989, at p. 191.
[176] Aréchaga, and Tanzi, 1991, at p. 352.
[177] For natural law in general, see Charles-Louis Secondat Montesquieu, "The Spirit of the Laws", translated and edited by Anne M. Cohler, Basia Carolyn Miller and Harold Samuel Stone, Cambridge University Press, Cambridge, New York, Port Chester, Melbourne, Sydney 1989; Montesquieu, "The Spirit of Laws", University of California Press, Berkeley, Los Angeles. London, 1984; Report P. George (ed.), "Natural Law", Ashgate Dartmouth Publishing Company, England, 2003.

> ture and the dictates of reason, are chiefly bound by the *jus gentium* which is derived from their consent and general practice.
> After Grotius, the Doctrine of Natural Law, while continuing to have a great influence on the humanization of international law, was gradually superseded by the Consensual Theory which built the rules of international law on the will and consent of civilized states.
> Thus, the recognized sources of the modern law of nations came to be custom, reason and consent as based chiefly on general law-making treaties'.[178]

Moreover, strict liability based on natural obligation was expressed in Roman law in the maxim: *sic utere tuo ut alienum non laedas* (use your property in such way as not to harm others).[179] According to this principle, the State is allowed to use its territory as a natural person enjoying the use of its own property. However, it should respect the rights of other States and prevent damage likely to be caused to them or their subjects.[180] Thus this principle limits the absolute power of the principle of State sovereignty when nuclear activities are conducted and obliges the State not to cause environmental damage to other States. Aréchaga pointed out:

> 'A state substantially affecting other states by emanations from within its borders –nuclear tests, fumes, air or water pollution, diversion of waters – is not abusing its own rights, but interfering with the rights of another, for it is the integrity and inviolability of territory of the injured state that is infringed. The acting state is in breach of a duty of non-interference established by customary international law, generally stated in the maxim: *sic utere tuo alienum non laedas'*.[181]

Accordingly, the State or the operator of a nuclear activity is obliged to compensate environmental damage caused by a nuclear accident as a result of the activity wherever the damage has materialized. This includes not only environmental damage caused to the neighbouring States, but also damage

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[178] Sobhi Mahmassani, "Principles of International Law in the Light of Islamic Doctrine", in: RDC, Vol. 117, Part I, 1966, pp. 201-328, at p. 234.

[179] Sompong Sucharitkul, "State Responsibility and International Liability in Transnational Relations", in: Jerzy Makarczyk (ed.), Theory of International Law at the Threshold of the 21st Century, Kluwer Law International, The Hague 1996, pp. 283-299, at p. 289.

[180] Sucharitkul, 1996, at p. 289.

[181] Aréchaga, 1968, at p. 540. It was also stated that '[t]he principle *sic utere tuo ut aliaenum non laedas* is a feature of law both ancient and modern. It is well known that the owner of a property is liable for intolerable smoke or smells, 'because he oversteps [the physical limits of his property], because there is *immissio* over the neighbouring properties, because he causes injury'. Dissenting Opinion of Judge De Castro, Nuclear Tests (Australia v. France), Judgment, ICJ Reports 1974, p. 253, pp. 372-390, at p. 388.

caused anywhere, regardless of whether it was caused by activities inside or beyond the borders of the State.

According to Principle 21 of the Stockholm Declaration as a customary international law principle, the State is responsible for ensuring that activities carried out within its territory or under its jurisdiction or control do not cause damage to the environment beyond its borders.[182] Principle 22 of this Declaration also imposes an obligation upon States to cooperate to develop further rules of liability and compensation in international law comparable to those for pollution damage and other environmental damage caused by ultra-hazardous activities carried out within their territory or under their jurisdiction or control. These two principles are part of an evolving process of customary international law.[183] In my opinion, despite the aim of Principles 21 and 22 of the Stockholm Declaration, the first priority is to protect the environment from the adverse effects caused by ultra-hazardous activities.[184] They generate State responsibility for a wrongful act rather than strict liability.[185] The two Principles oblige the State to ensure the protection of the environment and to cooperate with the development of its national legal system of liability in order to be consistent with the rules of international law. A breach of these obligations is merely considered a wrongful act. It was also stated:

> 'It is true that the wide terms of paragraph 21 of the Stockholm Declaration in regard to the environment, which refers to the responsibility of the State to ensure that no damage is caused, lend some apparent support to this thesis. However, that Declaration must be interpreted and applied within the framework of the general principles and rules of customary international law which govern State responsibility, as it is emphasized for instance in Articles 235 and 139 (2) of the Law of the Sea Convention of 1982. According to the customary rules a State's international responsibility for transfrontier pollution cannot be brought into play unless the State itself has caused the damage or, if it has been caused

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[182] Richard S. J. Tol and Roda Verheyend, "State Responsibility and Compensation for Climate Change Damages-A Legal and Economic Assessment", in: EP, Vol. 32, 2004, pp. 1109-1130, at p. 1011, available also at: http://www.fnu.zmaw.de/fileadmin/fnu-files/publication/tol/enpolliability.pdf (accessed on 16.2.2012); Fotis A. Karayiannopoulos, "International Environmental Law", available at: http://www.biopolitics.gr/BIOPOLITICS/HTML/PUBS/budapest/Fotis.html (accessed on 1.3.2012).

[183] Birnie, Boyle and Redgwell, 2009, at p. 218.

[184] For the customary principles and the protection of the environment see, McIntyre, NRJ, Vol. 46, 2006, pp. 157-210, also available at: http://lawlibrary.unm.edu/nrj/46/1/06_mcintyre_customary.pdf; http://www.esil-sedi.eu/fichiers/en/McIntyre_937.pdf (accessed on 20.2.2012).

[185] Aréchaga, RDC, Vol. 159, No. I, 1978, at p. 272.

> by private operators, the State has not taken all necessary and appropriate measures to prevent the occurrence of the damage'.[186]

At present, the two principles are indeed included in numerous international treaties which cover liability for damage caused by ultra-hazardous activities. The nuclear liability principles, including the principle of strict liability, were accepted by numerous contracting and non-contracting countries to the nuclear liability conventions. Nevertheless, there are doubts within the doctrine of international law about considering the principle of strict liability under these conventions as a customary international law principle. It was considered that the number of States which recognize the nuclear liability conventions is insufficient to establish the existence of a customary international law principle in accordance with the provisions of Article 38 (1) (c) of the ICJ Statute.[187] Sands argues:

> '[T]hat one must treat with caution arguments about the existence of customary international law […] that somehow there was a norm of practice which had developed. I tried to explain that there was no such norm of practice in the great majority of countries, and I think it would be very difficult to argue before the International Court of Justice, the European Court of Justice or any national court that the arrangements established in the Vienna and Paris Conventions reflect in some way customary international law. This is largely because so few states on a global basis have participated in them. One could of course imagine the notion of a regional custom in the European context, but even then, it would be fairly reasonable to argue that countries like Austria, Luxembourg and Ireland are persistent objectors. Furthermore, there is a lively debate as to whether procedural rules can ever be reflected in customary international law. Essentially all these conventions do is establish a series of procedural rules'.[188]

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[186] Aréchaga, and Tanzi, 1991, at p. 352.

[187] Pelzer, 2000, at pp. 586-587.

[188] P. Sands, Questions to / A: N. Pelzer, H. Kohlemainen, W. Gehr, in: OECD/NEA, "Reform of Civil Nuclear Liability", 2000, at p. 585. It was also argued that: '[I]t can be said that except for the corrective function – which is not endorsed by the present writer- general principles of national law play, in relation to conventional or customary international law, only a *subsidiary* role. The priority of conventional and customary international law is not only borne out by the history of the making of Article 38 of the Court's Statute, but is, moreover, justified by the fact that provisions of treaties or customary international law are, by nature, more direct emanations of the will of States and are often also more specifically related to subject matter envisaged by those provisions than are the general principles of national law. In short, those provisions relate to general principles of national law as *lex specialis* to *lex generalis*.' Lammers, 1984, at p. 162.

Accordingly, it seems that in general there is no clear agreement in the doctrine of international law on accepting strict liability as a general principle of customary international law which can apply to environmental damage caused by a nuclear accident. The States concluded the nuclear liability conventions which impose strict liability upon the operator of a nuclear installation because there is no customary international law to support the establishment of a general principle of strict liability.[189]

8.3.5 State practice and judicial decisions

There is some evidence in State practice that strict liability has been imposed on States for environmental damage caused by nuclear activities under customary international law and general principles of law of the civilized nations as recognized under Article 38 (1) (c) of the IJC.[190] This applies to the case between Canada and the former USSR regarding the crash of Cosmos 954 in Canadian territory in 1978.[191] This case is of particular interest because it concerns State liability for environmental damage caused by an ultra-hazardous activity, as the object was operated by a nuclear-powered source on one hand, and the liability was based on the principle of strict State liability on the other hand. This dispute was resolved with diplomatic negotiations, based on the concept of strict State liability under the 1972 Space Liability Convention and the general principles of international law.[192] According to this Convention, the principle of strict liability was considered a general principle of international law.[193] In this case, the USSR 'did not

[189] Okowa, 2000, at p. 121.

[190] Roda Mushkat, "The Daya Bay Nuclear Plant Project in The Light of International Environmental Law", in: UCLAPBLJ, Vol. 7, No. 1-2, 1990, pp. 87, 113, at p. 93.

[191] Brownlie, 1983, pp. 277-283; 18 ILM (1979), at pp. 902-907.

[192] Lammers, 1984, at p. 639; Okowa, 2000, at p. 113; ILC Secretariat, Survey, 1985, at p. 282.

[193] In support of the principle of strict State liability it was argued that '[t]he standards of absolute liability for space activities, in particular activities involving the use of nuclear energy, [… are] considered to have become a general principle of international law. A large number of States, including Canada and the Union of Soviet Socialist Republics, have adhered to this principle as contained in the 1972 Convention on International Liability for Damage Caused by Space Objects. The principle of absolute liability applies to fields of activities having in common a high degree of risk. It is repeated in numerous international agreements and is one of "the general principles of law recognized by civilized nations" (Article 38 of the Statute of the International Court of Justice). Accordingly, this principle has been accepted as a general principle of international law'. Canada: Claim against the Union of Soviet Socialist Republics for Damage Caused by Soviet Cosmos 954. ILM, Vol. 18, (1979) at p. 907, para. 22.

explicitly deny the existence of strict liability under general international law'.[194]

Another important case in State practice concerned the Marshall Islands Nuclear Tests, which were conducted by the United States in the Marshall Islands in 1954. The dispute concerning damage caused by these nuclear tests was resolved by diplomatic means without reference to judicial means. In 1954, the United States conducted a series of nuclear tests in the Marshall Islands. As a result, hundreds of Marshallese and the crew members of a Japanese fishing ship were exposed to radioactivity. The Japanese Government sued the United States for $7 million compensation for damage caused as a result of radioactivity released by the nuclear tests it had carried out. Finally, after lengthy negotiations, the US agreed to pay $2 million compensation as a compromise settlement for the whole dispute. However, the US did not admit legal responsibility for the damage caused by these nuclear tests.[195] There is no consensus in the doctrine of international law to consider the settlement of this dispute as clear evidence of a general principle of strict liability under customary international law. It was argued that 'the ex gratia payment of compensation by the United States for injury sustained by certain Japanese fishermen as a result of the US atmospheric nuclear test on the Marshall Islands cannot be regarded as a fully convincing precedent'.[196] Nevertheless, others consider that, 'the *ex gratia* payment which aims at circumventing the recognition of such a legal norm, [...] if [in fact] it corresponds with a structural trend, provides indirect evidence of a potentially existing or emerging apparent rule of customary law rather than concrete evidence of the non-existence of such a norm regardless of the formal characterization of these payments'.[197]

In international judicial decisions there is also evidence in a few remarkable cases which supports the principle of strict liability as customary international law.[198] Some of these cases are related to State liability for environmental damage caused by ultra-hazardous activities decided by arbitral tribunals and the ICJ. The Caire claim case between Mexico and France in 1929 was one of the earliest cases in contemporary international law, as it recognized the principle of strict liability of the State. This case is not related to hazardous activities, but it adopted the principle of strict liability in general. The decision of the Claims Commission in this case was based on the idea of guarantee which corresponds to strict liability. In this case, as men-

[194] Lammers, 1984, at p. 639.
[195] Horbach, 1996, at p. 259.
[196] Lammers, 1984, at p. 638.
[197] Horbach, 1996, at p. 261.
[198] Goldie, 1975, pp. 25-143, at p. 70.

tioned, a French citizen called Caire was killed by two Mexican officers in Mexico in 1927 after they demanded money from him.[199] The Government of France made a claim against the Mexican Government for killing Mr. Caire because the two officers were working for official organs in the Mexican Government. The Commission decided that Mexico was responsible for the murder because the two officers were answerable in their work to the Mexican Government. In Harris's translation, the Commission stated that:

> '[T]he international responsibility of the State is purely *objective* in character, and […] it rests on an idea of *guarantee*, in which the subjective notion of fault plays no part.
>
> But in order to be able to admit this so-called objective responsibility of the State for acts committed by its officials or organs outside their competence, they must have acted at least to all appearances as competent officials or organs, or they must have used powers or methods appropriate to their official capacity. …'[200]

Accordingly, the Commission implicitly based its decision on the concept of risk liability because it corresponded to the guarantee. It could not base its decision on either fault liability or wrongful act responsibility. However, in my opinion, the decision of the Commission is based on State responsibility for wrongful acts, as discussed in chapter 7. This is because the Commission examined the issue of competence in order to attribute the acts of the two officers to the State. The issue of competence is not involved in risk liability because the liability is incurred when the damage occurs and the victim has proved causality. Perhaps the Commission wanted to prove that individual liability could be attributed to the State.

One of the earliest cases that defined the content of State liability for ultra-hazardous activities was the 1941 Trail Smelter Arbitration Case between the United States and Canada.[201] The Smelter caused transboundary air pollution in the state of Washington. The Tribunal stated that:

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[199] Estate of Jean-Baptiste Caire (France) v. United Mexican States, Decision No. 33, 7 June 1929, RIAA, Vol. V, 1929, pp. 516-534, the text of the Case is in French and translated by David John Harris, "Cases and Materials on International Law", second edition, Sweet and Maxwell, London, 1979, pp. 400-401, at p. 400.

[200] Harris, 1979, at p. 401.

[201] The Trail Smelter case between the United States and Canada concerning a dispute between the two countries was instigated because of the emission of sulphur dioxide fumes from the operation of Trail Smelter in British Columbia. To resolve the dispute, the two countries established an International Joint Commission in 1931 to investigate the problem of the operation of the Smelter. It submitted its report and recommendations on 28 February 1931 for reparation of the damage caused by the smelter before 1932. In addition, they established an Arbitral tribunal to assess the damage caused by the smelter

> 'Under the principles of international law, as well as the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another State or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence'.[202]

This case constitutes a principle of international customary law for liability arising out of hazardous activities not prohibited by international law under which the State is obliged not to cause environmental damage to other States.[203] It was the first case to contribute to emerging international environmental law.[204] Although the Tribunal did not explicitly refer to the "the lawfulness or unlawfulness of the activity", it allowed the Smelter to continue to operate. Hence, this was an implicit recognition by the Tribunal of the lawfulness of the Smelter as a hazardous activity not prohibited by international law. It would have decided to prohibit the operation of the Smelter if the activity had been unlawful. The Tribunal also imposed an obligation on Canada to prevent damage caused by the Smelter in future and to bear the responsibility of damage caused by the Smelter to the United States, regardless of any fault or negligence. In addition, the Tribunal established an operational system for the Smelter in order to prevent damage caused by the Smelter in the State of Washington and to reduce the consequences of any damage caused by the Smelter in the future. The Tribunal decided, '[t]he tribunal is of the opinion that the prescribed regime will probably remove the causes of the present controversy and, as said before, will probably result in preventing any damage of a material nature occurring in the State of Washington in the future'.[205] However, the Tribunal did not indicate whether its decision was based on fault or non-fault liability.[206] This led to a difference of opinion. The Tribunal based its decision on the principle of strict liability

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after 1 January 1932. The Tribunal pronounced two decisions. In the primary decision in 1938 the tribunal decided that Canada was liable for environmental damage caused to the United States. The second was in 1941, when Canada was held responsible for preventing and repairing damage that might be caused by the smelter in future. (UNRIAA, Vol. III, at p. 1911). The decision in this case is also reproduced in James Barros and Douglas Millar Johnston, "The International Law of Pollution", The Free Press, New York, Collier Macmillan-London, 1974, at pp. 177-195.

[202] U.N.R.I.A.A., Vol. III, p. 1905, at, 1965; AJIL, No. 35, 1941, p. 684, at p. 716.

[203] Jutte Brunnée, "The United States and International Environmental Law: Living with an Elephant", in: EJIL, Vol. 15, No. 4, 2004, pp. 617-649, at p. 628.

[204] Jorge E. Viñuales, "The Contribution of the International Court of Justice to the Development of International Environmental Law: A Contemporary Assessment", in: FILJ, Vol. 32, Issue 1, 2008-2009, pp. 232-258, at p. 237.

[205] UNRIAA, Vol. III, at p. 1980.

[206] Hardy, ICLQ, Vol. 10, 1961, at p. 751; Hardy, BYIL, Vol. 36, 1960, at p. 229.

because it decided that Canada was liable for the payment of compensation for environmental damage and pollution caused by the Smelter to the USA and it imposed the measures regardless of the due diligence observed by the owners of the Smelter.[207] Handl argued that:

> 'After pronouncing in general terms on what it perceived to be the proper balance of rights and obligations between the two countries in [… this] case […], it laid down an operational regime for the Canadian smelter which was to provide reasonable assurance that the balance concerned would not be disturbed in the future. It then addressed the legal implications of the remaining possibility of significant transboundary harm despite [… observing] the regime of prevention. In so doing, the tribunal obviously moved from [… considering Canada to be responsible] for internationally wrongful conduct, to the issue of liability as a primary obligation. Compliance with the regime [… is equivalent to discharging] the obligation to act with due diligence. On the other hand, [the] damage [… which occurred despite this] compliance, [… which was] of an accidental nature not involving negligence on [… the part of Canada], was still deemed to entail a duty to repair transboundary harm'.[208]

Nevertheless, some writers pointed out that the decision of the Tribunal in the Trail Smelter case was in reality based of the concept of State responsibility for wrongful acts.[209] This is because the Tribunal 'amounted in reality to an obligation to prevent a given event, *its violation, therefore, amounting to a case of State responsibility'*.[210] Despite the fact that the Smelter's activities were lawful, the Tribunal's decision does not, in my opinion, reflect the existence of a general principle of strict liability. The lawfulness of the activ-

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[207] Barron, CJTL, Vol. 25, No 3, 1987, pp. 647-672, at p. 661; Horbach, 1996, at p. 241.

[208] G. Handl, "Liability As An Obligation Established by A Primary Rule of International Law", in: NYIL, Vol. XVI, 1985, pp. 49-79, at p. 61. Handl also stated that 'the Canadian Government's interpretation of the *Trail Smelter* case as a precedent for the *Cherry Point* claims, namely, as imposing strict and original liability on the United States in respect of both clean-up and damage costs incurred in British Columbia'. Günther Handl, "State Liability for Accidental Transnational Environmental Damage by Private Persons", in: AJIL, Vol. 74, No. 3, 1980, pp. 525-565, at p. 545.

[209] Brownlie, 1983, at p. 50; Birnie, Boyle and Redgwell, 2009, at p. 217; P. M. Dupuy, "International Liability for Transboundary Pollution", in: Michael Bothe (ed.) "Trends in Environmental Policy and Law (tendances actuelles de la politique et du droit de l'environnement)", International Union for Conservation of Nature Natural Resources, Gland, Switzerland, Erich Schmidt, Berlin, 1980, pp. 363-389, at p. 373; see also Kiss and Shelton, in Ndiaye and Wolfrum (eds.), 2007, at pp. 1131-1132.

[210] Karl Zemanek, "Cases and Forms of International Liability", in: Bin Cheng and E. D. Brown (eds.), Contemporary Problems of International Law: Essays in Honour of Georg Schwarzenberger on His Eightieth Birthday", Stevens & Sons Limited, London, 1988, pp. 319-332, at p. 326.

ity does not mean that liability must be based on the principle of strict liability. Liability for damage caused by such lawful activities can be based on the principle of strict liability or wrongful act liability or any other basis of liability. The Tribunal held Canada responsible for the pollution because it breached the obligation to regulate the activity under international law and to compensate for the damage.[211] In the above-mentioned passage the Tribunal stated that no State has the right to use its territory to cause damage to another State. This means that the State has an obligation to prevent damage to other States. The State breaches that obligation if damage materializes. The right and the obligation are two sides of the same coin.

Furthermore, there is no judicial decision by international courts involving the application of the principle of strict liability to State liability for environmental damage caused by nuclear activities. Nevertheless, some writers,[212] as well as the Report of the International Law Commission on the work of its forty-eighth session,[213] interpreted the dissenting opinion of some judges of the ICJ in the Nuclear Tests case between France and Australia in 1973 as an endorsement of the principle of strict liability of the State for nuclear damage caused to the environment. In that case, Australia claimed that the atmospheric nuclear tests conducted by France in the Pacific caused radioactivity which would affect the people of Australia and the environment.[214] However, the Court did not rule on the merits of the case, because France stopped conducting its nuclear tests. In his Dissenting Opinion, Judge Ignacio-Pinto argued that every State has the right to do what it wants within its boundaries and its sovereignty, and if damage is caused by these activities, it must repair the damage. '[E]ach State is free to act as it thinks fit within the limits of its sovereignty, and in the event of genuine damage or injury, if the said damage is clearly established, it owes reparation to the State having suffered that damage'.[215]

In conclusion, it could be argued that the above-mentioned decisions do not reflect a general principle of customary international law or a general principle of international law on strict liability in international case law which could be applicable to damage caused by ultra-hazardous activities including nuclear damage. This is because there are only a few cases which recognize the principle of strict liability, and no clear evidence for the existence of elements to establish customary international law on strict liability.

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[211] Barron, CJTL, Vol. 25, No 3, 1987, at pp. 651-652.
[212] Barron, CJTL, Vol. 25, No 3, 1987, at p. 662.
[213] YILC, 1996, Vol. II, Part Two, at p. 114.
[214] Nuclear Tests (Australia v. France), Request for the Indication of Interim Measures of Protection, Order of 22 June 1973, ICJ Reports 1973, p. 99, at p. 104.
[215] Ibid, ICJ Reports 1973, at p. 131.

8.4 Civil liability regimes on strict liability for environmental nuclear damage

The application of strict liability as a general principle in international law for environmental damage caused by nuclear accidents is observed in numerous conventions related to liability for environmental damage caused by ultra-hazardous activities including outer space, pollution, maritime, nuclear and other ultra-hazardous activities. The majority of these instruments govern the civil liability of the operator of the activity under private international law rather than the liability of the State under public international law. These conventions channel the liability onto the operator of the activity and exclude the international liability of the State for damage caused by a hazardous activity.[216] Environmental damage caused by a nuclear accident is essentially governed by the nuclear liability conventions. However, there are also some instruments which govern liability for damage caused by ultra-hazardous activities, including the 2006 ILC Draft Principles on the allocation of loss and harm caused by hazardous activities, and environmental conventions apply strict liability to nuclear damage. This section therefore discusses the application of the principle of strict liability for environmental damage caused by a nuclear accident under these conventions. This discussion involves the nuclear liability conventions (8.4.1), the ILC Draft Principles on the allocation of loss of hazardous activities (8.4.2) and the environmental liability conventions which deal with strict liability and apply to liability for environmental damage caused by a nuclear accident (8.4.3).

8.4.1 The nuclear liability conventions

The nuclear liability conventions were pioneering conventions which explicitly adopted the principle of strict liability to apply to nuclear damage caused by nuclear installations, including environmental damage.[217] The conven-

[216] See Kiss and Shelton, in Ndiaye and Wolfrum (eds.), 2007, pp. 1131-1151; Anne Daniel, "Civil Liability Regimes as a Complement to Multilateral Environmental Agreements: Sound International Policy or False Comfort?" in: RECIEL, Vol. 12, No. 3, 2003, pp. 225-241, also published in Reconciling, Law Justice and Politics in the International Arena by Canadian Council of International Law, Ottawa, 2004, pp. 132-171; Gehring and Jachtenfuchs, EJIL, Vol. 4, Issue 1, 1993, pp. 92-106.

[217] For absolute liability under nuclear liability conventions, see, Elli Louka, "Bringing Polluters Before Transnational Courts: Why Industry Should Demand Strict and Unlimited Liability for the Transnational Movements of Hazardous and Radioactive Wastes", in: DJILP, Vol. 22, No. 1, 1993, pp. 63-106, at pp. 78-81; Nanda, DJILP, Vol. 35, No. 1, 2006, at p. 51; Stoiber, Baer, Pelzer and Tonhauser, 2003, at p. 111.

tions refer to absolute rather than strict liability.[218] The principle is embodied in all the multilateral and bilateral nuclear liability conventions, and is implemented in the nuclear liability legislation of the Contracting and non-Contracting Parties.[219] These instruments impose strict liability on the operator of a nuclear installation where nuclear damage is caused by a nuclear accident in his installation or by nuclear substances coming from or to his installation, regardless of any fault or negligence.[220] They also impose an obligation upon the Installation State and other Contracting Parties to intervene to provide additional compensation to victims of a nuclear accident. These obligations are reflected in the objectives of the conventions which are mainly aimed at providing equitable and adequate compensation to victims of a nuclear accident, unifying and harmonizing national nuclear legislation and developing the nuclear industry.[221] They are also indirectly aimed at preventing and mitigating environmental damage caused by a nuclear accident.[222]

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[218] Stoiber, Cherf, Tonhauser and Carmona, 2010, at p. 99.

[219] For references on liability for nuclear damage under the nuclear liability conventions, see Fiona Wagstaff, "The Concept of Nuclear Damage under the Revised Paris Convention", in: Norbert Pelzer (ed.), "Die Internationalisierung des Atomrechts (Internationalizing Atomic Energy Law)", Tagungsbericht der AIDN/INLA-Regional tagung am 2. und 3. September 2004, in Celle, Norms Verlagsgesellschaft, Baden-Baden 2005, pp. 197-206; Edmund P. Carroll, "Why Does Ireland not Adhere to the International Nuclear Liability Convention?" in: Pelzer (ed.), 2005, pp. 229-238; Simon Carroll, "Perspective on the Pros and Cons of a Pooling-type Approach to Nuclear Third Party Liability", in: NLB, No. 1, 2008, pp. 75-97; Norbert Pelzer, "International Pooling of Operators' Funds: An Option to Increase the Amount of Financial Security to Cover Nuclear Liability?" Discussion Paper for the IAEA INLEX Group Meeting on 21-22 June 2007, in: NLB, No. 79, 2007, pp. 37-55; Ben McRae "The Convention on Supplementary Compensation for Nuclear Damage: Catalyst for A Global Nuclear Liability Regime", in: NLB, No. 79, 2007, pp. 17-35; Fabrizio Nocera, "The Legal Regime of Nuclear Energy: A Comparative Guide to the International and European Union Law", Intersentia, Antwerpen-Oxford, 2005, pp. 409-519; Schwartz, 2006, pp. 37-72; IAEA, "The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage-Explanatory Texts", in: IAEA, ILS, No. 3, 2007, pp.1-160; Håkan Rustand, "The Revision of the Paris/Brussels System: Important Improvements of the International Nuclear Liability Regime-Some Remarks", in: Norbert Pelzer (ed.), Brennpunkte des Atomenergierechts (Nuclear Law Problems in Focus), Symposium 26-27 September 2002 in Wiesbaden, International Nuclear Law Association (INLA), Nomos Verlagsgesellschaft, Baden-Baden, 2003, pp. 133-145.

[220] Dow, 1989, at p. 89.

[221] See the Preambles of the Paris Convention and the Vienna Convention.

[222] After the last revisions of the Paris Convention by the 2004 Protocol and the Vienna Conventions by the 1997 Protocol, they cover costs of preventive measures taken to prevent and minimize environmental damage caused by a nuclear accident.

To achieve these objectives, a number of nuclear liability principles have been established under the nuclear liability conventions. These include liability for nuclear damage is channeled exclusively onto the operator of a nuclear installation;[223] the liability of the operator is absolute, regardless of his fault or negligence;[224] the liability is limited in terms of amount and time;[225] the obligation of the operator to maintain insurance or other financial security for an amount corresponding to his liability;[226] the obligation of the State to ensure the liability of the operator and to provide additional compensation to victims of a nuclear accident;[227] exclusive jurisdiction as regards claims with the courts of the Contracting Party in whose territory a nuclear accident has occurred; recognition and enforcement of judgments of the competent courts by other Contracting Parties;[228] the right of recourse;[229] the application of the nuclear liability between victims of a nuclear accident, without discrimination based on the grounds of nationality or domicile or residence.[230]

These principles are included in the two main conventions, the Paris Convention and the Vienna Convention, as well as being incorporated in the national nuclear liability legislation. The principles therefore unify and harmonize the nuclear liability conventions and the nuclear liability legislation of different countries and bring them into line. Nevertheless, there are some differences between the two Conventions and the legislations in terms of the detail of their provisions, but not in the main provisions.[231] It should be noted that these principles have been discussed in relation to different aspects of this

[223] Articles 3 and 6 of the Paris Convention; Article II of the Brussels Nuclear Ships Convention; Article II of the Vienna Convention; Article 1 of the Brussels Convention on Maritime Carriage.
[224] Article 3 of the Paris Convention; Article II of the Brussels Nuclear Ships Convention; Article IV of the Vienna Convention.
[225] Article 7 and 8 of the 2004 Amended Paris Convention; Article III and V of the Brussels Nuclear Ships Convention; Article V and VI of the 1997 Amended Vienna Convention.
[226] Article 10 of the 2004 Amended Paris Convention; Article III of the Brussels Nuclear Ships Convention; Article VII of the 1997 Amended Vienna Convention.
[227] The 1963 Convention supplementary to the Paris Convention, as amended by the 2004 Protocol; the 1997 Convention on Supplementary Compensation for Nuclear Damage.
[228] Article 13 of the 2004 Amended Paris Convention; Article X of the 1962 Brussels Nuclear Ships Convention; Article XI of the Vienna Convention.
[229] Article 10 of the Annex of the 1997 Convention on Supplementary Compensation for Nuclear Damage.
[230] Gadkowski, 1989, at pp. 80-81.
[231] NEA, "Liability and Compensation for Nuclear Damage", 1994, pp. 58-59.

study. However, this section focuses mainly on an examination of the liability of the operator of a nuclear installation according to the principle of strict liability as adopted by the nuclear liability conventions.

8.4.1.1 Multilateral nuclear liability conventions

The 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy was the first nuclear liability convention to adopt the principle of absolute liability.[232] This Convention is a regional convention which covers liability for nuclear damage in the OECD countries. Under the Convention, the operator of a nuclear installation is held strictly liable for nuclear damage to or loss of life of any person and damage to or loss of any property where such damage is caused by a nuclear accident which occurred in a land-based nuclear reactor installation[233] or during the transport of nuclear materials.[234] This concept of nuclear damage was one the shortcomings of the convention because it was too narrow and excluded environmental damage caused by a nuclear accident. Therefore the concept of nuclear damage was expanded in the 2004 Protocol to Amend the Convention to also cover environmental damage, economic loss and costs of preventive measures and costs of measures of reinstating of the environment damaged by a nuclear accident.[235] The operator is held liable for nuclear damage caused by a nuclear accident within the geographical scope of the Contracting Parties to the Convention. Thus transboundary nuclear damage suffered by victims of a nuclear accident in the territory of non-Contracting Parties was excluded, unless it is covered by the national legislation of a Contracting State in whose territory the nuclear installation of the operator liable is located.[236] This definition was also amended by the 2004 Protocol to expand the geographical scope of the Convention to apply in principle to nuclear damage suffered in the territories of non-Contracting Parties, except in some cases.[237] Accordingly, the operator of a nuclear installation is held liable for environmental damage caused by a nuclear accident within the limit of the geographical scope of the convention. However, despite the fact that the liability of the operator of a nuclear installation is absolute under the Convention, the operator is exonerated from liability in the case of nuclear damage caused by a nuclear acci-

[232] Articles 3 and 4 of the 1960 Paris Convention; Articles 3 and 4 of the Amended Paris Convention. The Convention does not indicate the principle of absolute liability as does the Vienna Convention ((IV) (1) of the Vienna Convention).
[233] Article 3 (a) of the 1960 Paris Convention.
[234] Article 4 (b) of the 1960 Paris Convention.
[235] Article 1 (vii) of the 2004 Amended Paris Convention Protocol.
[236] Article 2 of the 1960 Paris Convention.
[237] Article 2 of the Amended Paris Convention.

dent directly due to an act of armed conflict, hostilities, civil war, insurrection, or a grave natural disaster of an exceptional character.[238] The last exoneration was omitted in the 2004 Paris Protocol. Therefore national legislation can provide for the liability of the operator for damage caused by a grave natural disaster of an exceptional character. In some cases, persons other than the operator are also liable for the damage, as in case of an act or omission by an individual with the intent to cause damage.[239] In principle the operator is still liable for the nuclear damage, and he is still liable to compensate the victims of the nuclear accident, although he has the right of recourse against the person who caused the damage afterwards.[240]

However, from the beginning the Paris Convention was the subject of major criticisms because it does not include any provisions on international liability or on State intervention to compensate the remaining nuclear damage caused by a nuclear accident. Therefore it was supplemented by the 1963 Brussels Supplementary Convention,[241] which provided for additional compensation for victims of a nuclear accident. This Convention was adopted because it was realized from the beginning of the nuclear liability regime under the Paris Convention that the amount of compensation under the Convention was too low and insufficient to cover all nuclear damage caused by a nuclear accident.[242] It is supplementary to the Paris Convention because its provisions complement the Paris Convention as regards additional compensation. In addition, the main provisions on nuclear liability in the Paris Convention are applied in both Conventions.[243] Therefore, the Contracting Parties to the Brussels Supplementary Convention should be also Contracting Parties to the Paris Convention. The Contracting Parties to the Paris Convention should also be parties to the Brussels Supplementary Convention in order to benefit from it.[244] As we will see in chapter 9, under the Brussels Supplementary Convention, the Installation State is liable for providing

[238] Article 9 of the 1960 Paris Convention.
[239] Article 6 (3) (1) (1) of the 1960 Paris Convention.
[240] For the right of recourse, see Article 6 (f) of the 1960 Paris Convention, Article 6 (f) of the Amended Paris Convention, Article 6 (c) (i) of the 1960 Paris Convention, Article 6 (c) (i) of the Amended Paris Convention.
[241] Convention of 31st January 1963 Supplementary to the Paris Convention of 29 July 1960, As Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982 ("Brussels Supplementary Convention"), the text of the Convention is available at: http://www.oecd-nea.org/law/nlbrussels.html (accessed on 22.7.2011).
[242] Philip McNamara, "The Availability of Civil Remedies to Protect Persons and Property from Transboundary Pollution Injury", Alfred Metzner Verlag, Frankfurt am Main, 1981, at p. 123.
[243] Article 1 of the 1963 Brussels Supplementary Convention.
[244] Article 2 of the 1963 Brussels Supplementary Convention.

additional compensation to supplement the liability of the operator of a nuclear installation under the Paris Convention, where the required amount of compensation for nuclear damage caused by a nuclear accident exceeds the limit of the liability of the operator under the Paris Convention, or in the case that the operator has failed to pay what he is liable for. The Contracting Parties to the Convention are also obliged to provide additional compensation where the amount of compensation provided by the Installation State is insufficient to cover all the claims for nuclear damage caused by a nuclear accident.[245] The amount of compensation provided for by the 1963 Brussels Supplementary Convention was further increased by the 2004 Brussels Protocol Amending it, which was adopted with the Protocol to Amend the Paris Convention on 12 February 2004.[246] However, despite the fact that the Amended Paris Convention expanded the geographical scope of the Convention to apply to Contracting and non-Contracting Parties, the Amended Brussels Supplementary Convention limited its geographical scope to apply only to its Contracting Parties. Thus compensation provided under the third tier of this Convention will be provided to victims of the Contracting Parties and excludes those of non-Contracting Parties.[247]

The 1962 Brussels Convention on the Liability of Operators of Nuclear Ships[248] was concluded because the Paris Convention and the Brussels Supplementary Convention only covered the liability of the operator for nuclear damage caused by land-based reactors and the transport of nuclear material, and excluded damage caused by means of transport.[249] Therefore the liability for damage caused by nuclear reactor ships is covered by the 1962 Brussels Convention on Nuclear Ships and maritime law.[250] Under the Convention, the liability of the operator of a nuclear ship is based on similar principles and provisions to those of the Paris and Vienna Conventions. The Conven-

[245] Article 3 of the 1963 Brussels Supplementary Convention.

[246] See Article 3 of the 2004 Protocol to Amend to the Brussels Supplementary Convention, available at: http://www.oecd-nea.org/law/Unofficial%20consolidated%20Brussels%20Supplementary%20Convention.pdf (accessed on 22.7.2011).

[247] Rustand, 2003, at p. 141.

[248] Paul C. Szasz, "The Convention on the Liability of Operators of Nuclear Ships", in: JMLC, Vol. 2, 1970-71, pp. 541-569; Könz, AJIL, Vol. 57, 1963, pp. 100-111.

[249] Article 1 (a) of the 1960 Paris Convention; Article I (j) (i) of the 1963 Vienna Convention.

[250] This restriction in the field of application of the Paris Convention to land-based reactors is due to the special nature of different treatment for many aspects of these installations and the liability for damage caused by nuclear reactor ships covered under the 1962 Brussels Convention on Nuclear Ships and maritime law. See Bette, Didier, Fornasier and Stein, 1965, at p. 11.

tion prohibits the operation of any nuclear ship without a licence. It requires an authorisation from the Flag State before starting the operation.[251] The Convention is a free-standing instrument and does not depend on being a party to other nuclear liability conventions. It also applies to nuclear damage worldwide.[252] However, it did not enter into force because it applied to civil and warships.[253] Therefore, some countries including the United States and the USSR refused to apply it to damage caused by warships.[254] Under the 1962 Brussels Nuclear Ships Convention, the operator of a nuclear ship is absolutely liable for any nuclear damage resulting from a nuclear accident caused by a nuclear ship involving nuclear fuel or radioactive products or waste produced by this ship.[255] A few exceptions are provided for under the convention exonerating the operator from liability in some circumstances, such as damage caused to the nuclear installation itself or its property, equipment or fuel, or where nuclear damage was caused by natural disaster or negligence of the victim, or where nuclear damage was caused directly by an act of war, hostilities, civil war or insurrection.[256] As mentioned above, these mean that the liability of the operator is strict rather than absolute under the convention.[257] In addition, a nuclear ship can be operated by the State under the Convention.[258] However, it does not address the strict liability of the State as an international subject. This was discussed during the negotiations for the Convention. However, it was a controversial issue,[259] and con-

[251] Article XV of the 1962 Brussels Nuclear Ships Convention.

[252] NEA, "Liability and Compensation for Nuclear Damage", 1994, at p. 61.

[253] According to Article I (11) of the 1962 Brussels Convention, '"Warship" means any ship belonging to the naval force of a State and bearing the external marks distinguishing warships of its nationality, under the commend of an officer duly commissioned by the Government of such State and whose name appears in the Navy List, and manned by a crew who are under regular naval discipline'.

[254] See Boulanger, IAEA, Legal Series No. 5, 1969, at p. 177.

[255] Article II (1) of the 1962 Brussels Nuclear Ships Convention.

[256] Articles II (3) and (5) VIII of the 1962 Brussels Nuclear Ships Convention.

[257] Some exceptions are provided by Articles 4 and 9 of the Convention and limit the effectiveness of the principle of absolute liability. Some authors reject the principle for these exceptions. See Sands, 1995, at p. 654.

[258] Article I (4) of the 1962 Brussels Nuclear Ships Convention.

[259] Jakub Handrlica, "Facing Plans for Multiplying Nuclear-Powered Vessels: Lessons Gained from the Brussels Convention on the Liability of Operators of Nuclear Ships of 1962", in: IJNL, Vol. 2, Issue 4, 2009, pp. 313-332, available at: http://cuni.academia.edu/JakubHandrlica/Papers/221997/Facing_Plans_for_Multiplying_Nuclear-
Pow-
ered_Vessels_Lessons_Gained_From_the_Brussels_Convention_on_the_Liability_of_Operators_of_Nuclear_Ships_of_1962 (accessed on 29.2.2012), at p. 10.

sequently the liability of a State must fall under national law when it operates nuclear ships.

The 1963 Vienna Convention on Liability for Nuclear Damage was adopted because there was a need for a worldwide convention to govern liability for nuclear damage as the nuclear liability conventions existing at the time did not meet this need. The Paris Convention and its 1963 Brussels Supplementary Convention is a regional convention which covers liability for nuclear damage in the OECD countries. The 1962 Brussels Nuclear Ships Convention is a worldwide convention, but it only covers liability for nuclear damage caused by nuclear ships. Therefore the 1963 Vienna Convention was adopted to govern liability for nuclear damage worldwide. It is a global convention and its membership is open to all the countries of the world. Even so, the main features of these conventions, apart from the Brussels Supplementary Convention, are the same, as they involve the same principles of liability. Liability for nuclear damage is absolute under the Convention.[260] The operator of a nuclear installation is held liable under the Vienna Convention for nuclear damage caused by a nuclear accident in his installation or by nuclear material coming from or sent to his installation.[261] However, the operator is not liable for environmental damage caused by a nuclear accident. There are some exceptions with regard to liability which exonerate the operator from liability. These include nuclear damage caused directly by an act of armed conflict, hostilities, civil war or insurrection or a grave natural disaster of an exceptional character, provided that there is no exoneration under the law of the Installation State.[262] As in the case of the Paris Convention, a grave natural disaster of an exceptional character as a reason for exoneration was eliminated in the Amended Vienna Convention.[263] These exonerations mean that the liability of the operator is strict rather than absolute under the Convention. Nevertheless, the operator is still liable for nuclear damage caused by a nuclear accident and for compensating the victims, although he has the right of recourse against any individual who has committed or omitted an act with intention of causing damage.[264] Nevertheless, like the Paris Convention, the Convention had major shortcomings, mainly because of the limited definition of nuclear damage, the geographical scope, the amount of liability and the absence of State liability. Therefore the Convention was amended by the 1997 Vienna Protocol which improved a

[260] Article IV (1) of the Vienna Convention; Article IV (1) of the Amended Vienna Convention.
[261] Article II (1) of the Vienna Convention.
[262] Article IV (3) of the Vienna Convention.
[263] Article IV (3) of the Amended Vienna Convention.
[264] Article X of the Vienna Convention, Article X of the Amended Vienna Convention.

number of nuclear liability issues in the convention, inter alia, expanding the definition of nuclear damage to include environmental damage, expanding the geographical scope of application of the Convention to apply in principle to nuclear damage caused by a nuclear accident suffered by non-Contracting Parties and increasing the amount of compensation for damage caused by a nuclear accident. Accordingly, the operator of a nuclear installation is liable for environmental damage caused by a nuclear accident wherever such damage is suffered in the territory of a Contracting State or in the territory of non-Contracting States, except in some cases where the nuclear damage suffered by the latter is excluded by the national legislation of a Contracting State.[265]

The 1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material was adopted because the Paris and Vienna Conventions did not affect the application of any international convention that was in force or adopted at the time of the conclusion of these conventions in the field of the international transport of nuclear material.[266] A number of maritime transport conventions were concluded before the Paris and the Vienna Conventions.[267] The carrier or the owner of the ship is held liable under strict liability or fault liability for damage caused by a nuclear accident during the transport of nuclear material in accordance with the applicable maritime transport convention. At the same time the nuclear liability conventions cover liability for damage caused during the transport of nuclear materials. Under the Paris and the Vienna Conventions, the operator of the nuclear installation is liable for damage caused by a nuclear accident during transport of the nuclear material coming to or from his nuclear installation. In order to prevent the simultaneous application of international maritime conventions and the Paris Convention or the Vienna Convention, and to prevent conflict between them, the 1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material was adopted.[268] This ensures that the operator of a nuclear installation is always

[265] Article I A of the Amended Vienna Convention.

[266] Article 6 (b) of the Paris Convention; Article II (5) of the Vienna Convention.

[267] See Strohl, IAEA Legal Series No. 8, Vienna 1972, at p. 91.

[268] This Convention was adopted under the auspices of the IMO at Brussels on 17 December 1971 and entered into force on 15 July 1975. See UNTS, Vol. 974, at p. 255, also available at: http://www.admiraltylawguide.com/conven/carriagenuclear1971.html (accessed on 7.5.2011); T. S. Busha, "The Work of IMCO on Maritime Carriage of Dangerous Goods and Third Party Liability Problems in Relation to Oil Pollution", in: IAEA and OECD/NEA, Third Party Liability and Insurance in the Field of Maritime Carriage of Nuclear Substances, Monaco Symposium, 7th-11th October 1968, OECD Paris 1970, pp. 169-175, at p. 170.

absolutely and exclusively liable under the Paris and Vienna Conventions for nuclear damage caused by a nuclear accident occurring during the transport of nuclear materials.[269] According to the Convention, any person liable for nuclear damage caused by a nuclear accident during the transport of nuclear material by maritime transport under any international maritime convention is exonerated from liability if the operator of the nuclear installation is liable for such damage under the Paris or Vienna Convention or a national law governing the liability for such damage, provided that this law favours victims of nuclear damage as in the case of the Paris or Vienna Convention.[270] The exoneration also applies to damage caused to the nuclear installation itself or to property on the site or property related to the installation or the means of transport carrying the nuclear material for which the operator of the nuclear installation is not liable. However, this does not affect the liability of individuals who intentionally caused the damage.[271] Accordingly, this Convention is considered to be a link and supplementary to the Paris and Vienna Conventions as regards liability for nuclear damage caused during the transport of nuclear material by sea. It applies to environmental damage according to the 1997 Protocol Amending the Vienna Convention and the 2004 Protocol Amending the Paris Convention.

The 1988 Joint Protocol Relating to the Application of the Paris Convention and the Vienna Convention was adopted after the Chernobyl accident to link the two Conventions[272] because there was no relationship between them, despite the fact that they are nearly identical and are based on the same nuclear liability principles and cover the same geographical scope.[273] The Protocol is aimed at expanding the geographical scope of the two Conventions and preventing conflicts in the case of the simultaneous application of both Conventions to one nuclear accident.[274] The operator of a nuclear reactor

[269] The Preamble of the 1971 Brussels Convention on Carriage of Nuclear Material.
[270] Article 1 of the 1971 Brussels Convention on Carriage of Nuclear Material.
[271] Article 2 of the 1971 Brussels Convention on Carriage of Nuclear Material.
[272] The Joint Protocol Relating to the Application of the Vienna and the Paris Convention, adopted on 21 September 1988, IAEA Doc. INFCIRC/402, available at: http://www.iaea.org/Publications/Documents/Infcircs/Others/inf402.shtml (accessed on 18.4.2012). For the history of the development and adoption of the Protocol, see O. von Busekist, "A Bridge Between Two Conventions on Civil Liability for Nuclear Damage: The Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention", in: NLB, No. 43, 1989, pp. 10-15, reproduced in NEA, International Nuclear Law, 2006, pp. 129-153.
[273] Norbert Pelzer, "Inadequacies in the Civil Nuclear Liability Regime Evident after the Chernobyl Accident: The Response in the Joint Protocol of 1988", in: OECD/NEA and IAEA, Paris, 1993, p. 161.
[274] The Preamble of the 1988 Joint Protocol.

located in the territory of a Contracting Party to the Vienna Convention is liable for nuclear damage caused by a nuclear accident suffered in the territory of the Contracting Parties to the Paris Convention where they are parties to the Protocol as well.[275] Similarly, the operator of a nuclear installation located in the territory of a Contracting Party to the Paris Convention is liable for nuclear damage caused to the Contracting Parties to the Vienna Convention where they are parties to the Protocol.[276] Thus the Protocol applies the principle of reciprocity to extend the benefits of one convention to the other. The link between the two Conventions created by the Protocol broadens and unifies the regime of nuclear liability under them to cover nuclear damage caused by nuclear accidents in land-based nuclear reactors and during the transport of nuclear material. Under the Protocol either the Vienna Convention or the Paris Convention is applicable. However, the applicable convention is the convention of the State Party within whose territory the nuclear installation is located and the operator who is liable.[277] Although the Protocol does not include substantive provisions on liability for nuclear damage, it expands the principle of absolute liability because it expands its application to more States. It also extends the geographical scope of application of the two conventions to benefit more victims of a nuclear accident. However, the real benefit of the Protocol will be realized when all nuclear States ratify the two conventions and the Protocol. Extending the geographical scope of nuclear liability depends on the number of contracting parties to the applicable convention. Unfortunately, the nuclear liability conventions did not apply to the environmental damage caused by the Chernobyl accident because the USSR was not party to these conventions.[278] If a State is not party to a nuclear liability convention it should apply its own national law, but at the time of the accident the USSR had no national nuclear legislation either. Japan is not party to any nuclear liability convention. Therefore it will apply its own national law to the damage caused by the Fukushima nuclear accident.

Finally, the 1997 Convention on Supplementary Compensation for Nuclear Damage[279] obliges the State to pay additional compensation to victims

[275] Article II (a) of the Joint Protocol.
[276] Article II (b) of the Joint Protocol.
[277] Article III (3) of the Joint Protocol.
[278] Catherine Redgwell, "International Environmental Law", in: Malcolm D. Evans (ed.), International Law, Third Edition, Oxford University Press, New York, 2010, pp. 687-721, at p. 705.
[279] Vladimir Boulanenkov, "Main Features of the Convention on Supplementary Compensation for Nuclear Damage-An Overview", in: OECD/NEA and IAEA, 2000, pp. 161-170; McRae, 2000, pp. 171-183; Ki-Gab Park, "The Convention on Supplementary

of a nuclear accident, as will be discussed in the following chapter. This Convention is a free-standing Convention and is not supplementary to any nuclear liability convention. It allows all States to be party to it, not only the Contracting Parties to the Paris and Vienna Conventions.[280] It does not provide for the liability of the operator, but it was supplemented by an Annex which constitutes an integral part of the Convention[281] and applies by itself without the need to apply national legislation. This Annex provides for the liability of the operator of a nuclear installation. The Annex allows a State whose national legislation is based on the economic channel principle to participate in the Convention which is based on the legal channel principle, without the need to change its national legislation. In reality, the Annex was adopted to satisfy the situation in United States because its national nuclear legislation is based on the economic channel principle and it is not party to the Vienna and Paris Conventions, which are based on the principles of legal channel and absolute liability.[282] According to the Annex, the liability of the operator of a nuclear installation is absolute.[283] The operator is liable for damage caused by a nuclear accident in his installation or by a nuclear accident caused during the transport of nuclear material coming from or to the nuclear installation.[284] Thus the operator is liable for environmental damage once the victims have proved the causal link between the damage sustained and the accident, without the need to prove negligence or fault on the part of the operator. However, as in other nuclear liability conventions, the operator is exonerated from liability under the Annex where the nuclear damage caused by a nuclear accident is directly due to an act of armed conflict, hostilities, civil war, or insurrection or in the case of a grave natural disaster of an exceptional character, unless national legislation of the Installation State provides otherwise.[285] There are other circumstances which relieve partly or wholly the operator from liability.[286] The provisions in the Annex on liability are identical to those on liability in the Amended Paris and Vienna Conven-

Compensation for Nuclear Damage and Asian States: The Advantages and Disadvantages of Korea's Adherence to the Convention", in: OECD/NEA and IAEA, 2000, pp. 203-215; Ben McRae, "Compensation on Supplementary Compensation for Nuclear Damage (SCS) and Harmonisation of Nuclear Liability Law within the European Union", in: NLB, No. 87, 2011, pp. 73-86.

[280] Article II (2) of the 1997 Compensation Convention.

[281] Article II (3) of the 1997 Compensation Convention.

[282] McRae, NLB, No. 61, 1998, p. 29 and NEA2006, at p. 197.

[283] Article 3 (3) of the Annex.

[284] Article 3 (1) of the Annex.

[285] Article 3 (5) of the Annex.

[286] Article 3 (6) and (7) of the Annex.

tions. This is important for the Convention to be consistent with those Conventions. The Convention was concluded as a compromise because the Member States to the Vienna Convention, as mentioned above, had failed to adopt an international convention on State liability for nuclear damage or to include the provisions of the Amended Vienna Convention governing the liability of the State for nuclear damage.

8.4.1.2 Bilateral nuclear liability agreements

There are several bilateral agreements between States in the field of nuclear liability which provide for the principle of absolute liability for nuclear damage. Most of these agreements were concluded in the field of nuclear reactor ships between States operating nuclear ships and host States, in order to organize liability for nuclear damage caused by these ships when they visit the territorial waters and ports of these States. These agreements were concluded because the 1962 Nuclear Ships Convention did not enter into force.[287] This Convention was used as a pattern to conclude these agreements. Therefore the provisions of these agreements are based on similar principles of nuclear liability to those included in the 1962 Nuclear Ships Convention, which are themselves similar to those in the nuclear multilateral agreements and national laws.[288] Most of the bilateral liability agreements are related to the American nuclear ship *Savannah* and the German nuclear ship *Otto Hahn*.

Since the American nuclear ship *Savannah* entered into operation, the United States has concluded several bilateral agreements with many countries, particularly the European countries such as West Germany, Belgium, the United Kingdom, the Netherlands, Norway, Ireland, Denmark, Sweden, Portugal, Italy and Greece.[289] The United States has accepted strict liability

[287] Boulanger, IAEA Legal Series, No. 5, Vienna 1969, at p. 177.

[288] See generally, ILC Secretariat, Survey, A/CN.4/384, 1985.

[289] For instance, the Agreement between the United States of America and Italy on the Use of Italian Ports by the N. S. Savannah, (with annex). Signed in Rome on 23 November 1964, came into force on 23 November 1964, upon signature, in accordance with Article X, UNTS, Vol. 532, 1965, p. 133; Agreement between the Kingdom of the Netherlands and the United States of America on Public Liability for Damage Caused by the N. S. Savannah (with annex). Signed in The Hague on 6 February 1963, came into force on 22 May 1963, the day on which each Government received from the other Governments written notification that it had complied with all the statutory and constitutional requirements for the entry into force of the Agreement, in accordance with Article 10, UNTS, Vol. 487, 1964, p. 113; the Netherlands and the United States of America, Operational Agreement on Arrangements for a Visit of the N. S. Savannah to the Netherlands. Signed in The Hague, on 20 May 1963, in accordance with Article 29, the Agreement came into force on 22 May 1963, UNTS, Vol. 487, p. 123; the United States of America and Ireland, Exchange of Notes Concerning an Agreement Relating to Public Liability

for nuclear damage caused by the *Savannah* when it visits ports of other States,[290] even during its operation by a private company.[291] These agreements are now considered to be in obsolete as regards the operation of the *Savannah* under the Government of the United States. The operation of the *Savannah* was transferred to a private company (FAST, First Atomic Ship Transport). Therefore new bilateral agreements were concluded with the host countries by exchange of letters and this subsequently led to the conclusion of new regulations by some countries and to other countries enacting new legislation to cover liability and compensation under the new situation.[292] These agreements were concluded in order to guarantee liability for nuclear risk in the event of the occurrence of a nuclear accident caused by the American Ship *Savannah* during its visit to their ports. However, the agreements do not define the nuclear damage to be covered and left this to be defined under United States law. Under United States law, damage caused by a nuclear accident includes 'bodily injury or death or loss of or damage to property or loss of use of property, arising out of or resulting from the radioactive toxic, explosive, or other hazardous properties of source, special nuclear, or by-product material'.[293] This definition covers only physical damage; moral damage is left to be determined by the competent courts.[294] The agreements also provide for the liability of the United States for nuclear damage caused by

for Damage Caused by the N. S. Savannah, Dublin, 18 June 1964, entered into force the same day by the exchange of the said notes, UNTS, Vol. 530, p. 217; Agreement between the Government of the United States of America and the Government of Italy on the Use of Italian Ports by the N. S. Savannah, signed in Rome, on 23 November 1964. UNTS, Vol. 532, 1965, p. 138.

[290] Article I (2) (1) of the agreement of 18 June between the United States of America and Ireland concerning Exchange of notes constituting an agreement relating to public liability for damage caused by the N. S. Savannah provides:

'(1) The United States Government shall provide compensation for all loss, damage, death or injury in Ireland (including Irish territorial seas) arising out of or resulting from the operation of the N.S. Savannah to the extent that the United States Government, the United States Maritime Administration or a person indemnified under the indemnification Agreement is liable for public liability in respect of such loss, damage, death, or injury'. "Exchange of notes constituting an agreement between the United States of America and Ireland relating to public liability for damage caused by the N.S. Savannah", Dublin, of 18 June 1964, UNTS, Vol. 530, at p. 217.

[291] ILC Secretariat, Survey, A/CN.4/384, 1985, at p. 279.

[292] E. Maurer, "The Work of the Foreign Office Lawyer in the Field of Peaceful Uses of Atomic Energy", in: IAEA, Nuclear Law for A Developing World, IAEA Legal Series, No. 5, IAEA Vienna 1969, pp. 95-105, at p. 101; Boulanger, IAEA Legal Series, No. 8, 1972, at p. 127.

[293] Pontavice, 1977, at p. 473.

[294] Pontavice, 1977, at p. 473.

nuclear accidents in connection with the ship during the construction, operation, reparation, maintenance and the use of the nuclear ship *Savannah*.[295] However, these agreements govern the liability of the US as a private operator under the national system of the State rather than the liability of the State under international law. They also excluded the right of recourse to recover compensation paid by the United States instead of other liable persons. Accordingly, '[t]he United States shall pursue no rights of recourse against any person who on account of any act or omission committed on Netherlands territory would be liable for damage as described in Article 1'.[296] Paragraph 4 of the agreement of 18 June 1964 between the United States and Ireland concerning exchange of notes constituting an agreement relating to public liability for damage caused by the *N. S. Savannah*[297] is a similar provision.

The principle of strict liability was also included in the bilateral agreements between Germany and various States such as Liberia and Brazil regarding the visit of the nuclear ship the *Otto Hahn* to their ports.[298] For instance, under Article 13 of the 27 May 1970 Treaty between Liberia and

[295] Article VIII of the agreement of 23 November 1964 between the Government of the United States of America and the Government of Italy on the Use of Italian Ports by the N. S. Savannah provides: 'Within the limitations of liability set by United States Public Law 85-256 (annex A), as amended by 85-602 (annex B), in any legal action or proceeding brought in *personam* against the United States in an Italian court, the United States Government will pay compensation for any responsibility which an Italian court may find, according to Italian Law, for any damage to people or goods deriving from a nuclear accident in connection with, arising out of or resulting from the operation, repair, maintenance or use of the Ship, in which the N. S. Savannah may be involved within Italian territorial waters, or outside of them on a voyage to or from Italian ports if damage is caused in Italy or on ships of Italian registry'. UNTS, Vol. 532, at p. 133.

[296] Article 3 of the agreement of 6 February 1963 between the Netherlands and the United States regarding liability for damage caused by the visit of the *N. S. Savannah* to the Netherlands ports.

[297] UNTS, Vol. 530, 1965, p. 217.

[298] Treaty between the Republic of Liberia and the Federal Republic of Germany on the Use of Liberian Waters and Ports by the *N. S. Otto Hahn*, Bonn on 27 May 1970, Bundesgesetzblatt, Teil II, 21 July 1971, No. 34, pp. 953-959; Treaty on the Use of Waters and Ports by N.S. "Otto Hahn" between the Federal Republic of Germany and the Netherlands, 28 October 1968, Bundesgesetzblatt, Teil II, 1121 , 1969; Treaty Between the Federal Republic of Germany and the Federal Republic of Brazil Concerning the Entry of Nuclear Ships into Brazilian Waters and Their Stay in Brazilian Ports, signed at Brasilia on 7 June 1972, registered by the Federal Republic of Germany on 5 May 1975, UNTS, Vol. 966, 1975, No. 13935, p. 183, available at: http://untreaty.un.org/unts/1_60000/27/2/00052077.pdf (accessed on 5.7.2011); Treaty on the Use of Waters Ports by N.S. "Otto Hahn" between the Federal Republic of Germany and Portugal, 29 January 1971, Bundesgesetzblatt, Teil II, 57, 1972; See Horbach, 1996, p. 351.

Germany concerning the use of the Liberian ports by the *N. S. Otto Hahn*, the operator is strictly liable for nuclear damage caused by this ship. Liability for nuclear damage caused by the ship under this Treaty is governed by the 1962 Brussels Nuclear Ships Convention.[299] The 1972 Agreement between Germany and Brazil also provides that: 'The operator shall be absolutely liable for any nuclear damage upon proof that such damage has been caused by a nuclear incident involving the nuclear fuel of, or radioactive products or waste produced in, the ship'.[300] This agreement also obliges the master of the ship to inform the Brazilian authorities in the case of a nuclear accident occurring on the ship, causing environmental damage to the Brazilian waters or ports during the ship's passage or while it is in the ports.[301] A number of bilateral agreements allow for exoneration from liability for nuclear damage. Article 13 of the 27 May 1970 agreement between Germany and Liberia concerning the use of the Liberian waters and ports by the German *N. S. Otto Hahn* provides for exoneration of the operator of the ship from liability in the case of nuclear damage caused directly by an act of war, hostilities, civil war or insurrection.[302] Furthermore, Article 6 (2) of the agreement between Germany and Brazil concerning the entry of nuclear ships into the Brazilian waters and ports states that, '[i]f the operator proves that the nuclear damage resulted wholly or partially from an act or omission done with intent to cause damage by an individual who suffered damage, the competent courts may exonerate the operator wholly or partially from his liability to such individual'.[303]

8.4.1.3 National nuclear legislation

The US Price Anderson Act of 1946 was the first nuclear liability law adopted to govern liability for nuclear damage caused by a nuclear acci-

[299] Article 12 of the 1970 Treaty between the Republic of Liberia and the Federal Republic of Germany.

[300] Article 6 (1) of the agreement of 7 June 1972 between Germany and Brazil concerning the entry of the Brazilian water and ports by Germany nuclear ships.

[301] Article 5 (5) of the 1972 Agreement between Germany and Brazil provides that, '[i]n the event of any accident likely to lead to an environmental hazard while the ship is in or is approaching Brazilian waters or ports, the master shall immediately inform the Authority in accordance with chapter VIII, regulation 12, of the SOLAS Convention and shall immediately comply with its instructions'.

[302] Treaty of 27 May 1970 between Germany and Liberia on the Use of Liberian Waters and Ports by N. S. Otto Hahn.

[303] Treaty between the Federal Republic of Germany and Brazil on the entry of nuclear ships into Brazilian waters and their stay in the Brazilian ports, signed in Brasilia on 7 June 1972, UNTS, Vol. 966, 1975, p. 183.

dent.[304] However, in the late 1950s, as a result of the increasing use of nuclear energy for peaceful purposes, a number of nuclear liability laws were concluded by the States, including the legislation of the United States in 1957, and of the Federal Republic of Germany, Switzerland and the United Kingdom in 1959.[305] This legislation was enacted under different systems of law. Of course, this can lead to some differences in the legislation which should be based on the principle of risk liability, as nuclear energy is one of the most hazardous activities.

To harmonize and unify this legislation, the nuclear liability conventions, were concluded in the 1960s, as mentioned above, and established the nuclear liability principles. These principles were embodied in the recent nuclear liability legislation of the Contracting and non-Contracting Parties to the Conventions. Most of the States involved in nuclear activities, including Contracting and non-Contracting Parties enacted nuclear liability legislation. This legislation imposed strict liability upon the operator of a nuclear installation for nuclear damage caused by nuclear accidents in his installations. The principle of strict liability therefore gained the support of a large number of the Contracting and non-Contracting Parties to the nuclear liability conventions.[306]

The principle of absolute liability has now been incorporated in the nuclear liability legislation of many States which is considered as part of their legal system. These include, *inter-alia*, the nuclear national liability regimes of Austria,[307] Belgium,[308] Brazil,[309] Canada,[310] China,[311] Egypt,[312] Italy,[313]

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[304] Miatello, 1987, at p. 292.

[305] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 41.

[306] Pelzer, 2000, at p. 586.

[307] Section 3 (2) of the Nuclear Liability Act of 29 April 1964 on Liability for Nuclear Damage as amended by the Act of 25 February 1976.

[308] Section 5 of the Act of 22 July 1985 on Third Party Liability in the Field of Nuclear Energy, amended on 8 June 2000, available at: http://www.oecd-nea.org/law/nlb/Nlb-66/075-080.pdf (accessed on 11.9.2011).

[309] Section 4 of the Act No. 6.453 of 17 October 1977 on civil liability for nuclear damage and criminal responsibility for acts relating to nuclear activities. Absolute and exclusive liability of the operator became part of the Brazilian Constitution adopted on 8 October 1988, (Constitution, Section 21, Clause XXIII, letter C).

[310] Section 4 of the Canadian Nuclear Act adopted on 19 June 1970, as amended in 1985.

[311] The Chinese nuclear liability legislation established according to a written declaration of the Chinese Council of State in April 1986.

[312] Strict liability under the Egyptian law, particularly with regard to application of the Egyptian draft national nuclear liability law. See Horbach, 1996, at p 215. For the draft of the Egyptian Nuclear Liability Legislation, see Mohamed, 1993, at p. 713. Egypt is currently enacting new nuclear legislation.

Japan,[314] Republic of Korea,[315] Malaysia[316] and Mexico.[317] Despite the subsequent amendments to this legislation, the principle of absolute liability of the operator of a nuclear installation for nuclear damage caused by a nuclear accident is still an essential principle in this legislation. However, as in the case of the nuclear liability conventions, this legislation provides for the exoneration of the operator of a nuclear installation in some circumstances. This means that the operator has strict rather than absolute liability. For example, the French Act of 30 October 1968 on third party liability in the field of nuclear energy, as amended in 1990, exonerates the operator of a nuclear installation from liability if a nuclear accident is caused directly by armed conflict or a grave disaster of exceptional character.[318]

The endorsement of the principle of strict liability in national nuclear legislation shows that there is a growing tendency to recognize the principle of strict liability as a general principle of law of the civilized nations to govern liability for environmental damage caused by hazardous activities in general and by nuclear energy in particular. It also supports a general principle of customary international law because this legislation was adopted by civilized and non-civilized nations. It also endorses the principle as adopted by the nuclear liability conventions to cover the liability of the operator of a nuclear installation,[319] as this legislation is an application of the principle as adopted by the nuclear liability conventions.

This nuclear liability legislation applies to liability for environmental damage caused by a nuclear accident within the territory of the Installation State and transboundary environmental damage where it embodies the new amendments adopted by the 1997 Protocol to Amend the Vienna Convention and the 2004 Protocol to Amend the Paris Convention.[320] The nuclear liabil-

[313] Sections 15 and 18 of the Act No. 1860 of 31 December 1962 on the peaceful uses of nuclear energy.

[314] Section 3 and 4 of the Law No. 147 of 17 June 1961 on Compensation for Nuclear Damage.

[315] Section 3 (1) and (3) of the Act No. 2094 of 24 January 1969 on Nuclear Damage Compensation as amended by Act No. 2765 of 7 April 1975.

[316] Section 45 of the Atomic Energy Licensing Act 1984 (Act No. 304).

[317] Section 4 of the Act on Third Party Liability for Nuclear Damage, promulgated on 29 December 1974.

[318] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 66.

[319] Alfonso de los Santos Lasúrtegui, "Nuclear Liability: Study of a National in the Light of International Conventions", in: IAEA, Nuclear Law for a Developing World, Lectures given at training course, Vienna, 16-26 April 1968, IAEA Legal Series No. 5, IAEA Vienna 1969, pp. 117-142, at p. 119.

[320] For a comparative study of the implementation of the nuclear liability conventions by national nuclear law and national environmental law for environmental damage caused

ity conventions also give national nuclear legislation a broader scope to expand the provisions of the Conventions, which leave the State to cover issues of liability not covered by the conventions in its national legislation.[321] The application of the principle of strict liability is certainly in the interests of the victims of a nuclear accident and the operator of a nuclear installation. Nevertheless, there are some countries which recognize the principle of strict liability in common law, but do not consider it as a general principle of liability.[322] This casts some doubt on whether the principle of strict liability under the rules of common law is always applicable to environmental damage caused by a nuclear accident. American nuclear liability law, for instance, does not recognize the principle of strict liability as a general rule for the legal basis of liability. Liability under this law is based on the rules of the general principle of common law which may be based on strict or fault liability in accordance with the law of the State in whose territory a nuclear accident has occurred.[323] US law does not provide for a basis of liability and leaves it to the judge to decide whether the liability is based on strict or fault liability.[324] The recognition by the US of the principle of strict liability as a general principle of law is important in relation to liability for environmental damage caused by a nuclear accident. This is simply because it operates a quarter of the nuclear reactors in the world.

8.4.2 The ILC principles of allocation of loss

The Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities[325] adopted by the ILC in 2006 include the Preamble and eight principles of liability. The Principles govern

by a nuclear accident, see Julian Gomez del Campo, "Report on Environmental Nuclear Damage: Working Group 2 Report", in: International Nuclear Law Association, 1999, pp. 203-247.

[321] Articles 1 (a) (vi), 2, 4 (d), 6 (h), 7 (b) (i), 7 (c), 7 (d), 8 (a), 8 (c), 8 (e), 9, 11, 13 (c), 14 (b) and 15 (a) of the Paris Convention; Articles I (c), II (2), II (7), IV (3) (b), IV (6), V (1), VI (1), VI (3), VI (4), VIII and IX (1), XI and XII (2) of the Vienna Convention.

[322] However, the principle of strict liability is not the only basis of liability included in all national liability legislations, e.g., German, Austrian and Swiss legislation which apply the general rules of common law. In principle, the legislation of these countries does not have a general system to apply strict liability as a basis of liability, but applies it by special legislation. In addition, liability under common law is unlimited in amount and does not provide for obligatory obligations for covering all damage resulting from risk activities. See Pelzer, 1994, at p. 271.

[323] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 81.

[324] Pelzer, 1994, at p. 279.

[325] For the text of the Draft Principles see UN Doc. (A/61/10), will be reprinted in YILC, 2006, Vol. II, Part Two.

liability for hazardous activities under international law in general, including environmental nuclear damage.[326] There is a particular emphasis on the liability of a State for the preservation and protection of the environment.[327] The Principles apply only to transboundary damage caused by hazardous activities involving significant damage[328] because such damage can cause transboundary damage and destruction to the environment. Activities involving no significant damage are therefore excluded. Furthermore, it was realized that the classical idea of liability that based on compensation and reparation of damage is not sufficient to protect the environment. Therefore the principles set forth a comprehensive regime of liability aimed at preventing, minimizing and redressing environmental damage caused by hazardous activities. The basic objective of the principles is to provide prompt and adequate compensation to victims who have suffered transboundary damage caused by hazardous activities including environmental damage. The principles are also aimed at the preservation and protection of the environment and the prevention of transboundary damage caused by hazardous activities and the mitigation of such damage and at restoring and reinstating the environment to its previous condition.[329]

To achieve these objectives, the Principles meet the basic substantive requirements. They oblige the State of origin to take appropriate, prompt and effective measures to minimize and reduce transboundary damage. The State is also obliged to respond promptly to an accident caused by hazardous activities and to consult and cooperate with other States which are likely to suffer damage and to seek the assistance of specialized international organizations and other States.[330] In addition, the Principles oblige States to cooperate in the development of global, regional and bilateral regimes of response to prevent, reduce and compensate the incidence of transboundary damage caused by hazardous activities.[331]

However, if environmental damage is nevertheless caused by a hazardous activity, the State is obliged to repair such damage. Thus the Principles require the State of origin to establish international and domestic mechanisms and to provide appropriate procedures to ensure that the victims are compen-

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[326] See in general, Kecskés, AJH, Vol. 49, No. 2, 2008, pp. 221-252; Currie, DJILP, Vol. 35, No. 1, 2006, pp. 85-127; Kiss, DJILP, Vol. 35, No. 1, 2006, pp. 67-83; Van Dyke, DJILP, Vol. 35, No. 1, 2006, pp. 13-46; Nanda, DJILP, Vol. 35, No. 1, 2006, pp. 47-65.

[327] The Preamble of the 2006 ILC Draft Principles on the Allocation of Loss.

[328] Principle 1 of the 2006 ILC Draft Principles on the Allocation of Loss.

[329] Principle 3 of the 2006 ILC Draft Principles on the Allocation of Loss.

[330] Principle 5 of the 2006 ILC Draft Principles on the Allocation of Loss.

[331] Principle 7 of the 2006 ILC Draft Principles on the Allocation of Loss.

sated and that domestic, administrative and judicial mechanism are available, and to guarantee the victims access to information relevant to their claims for compensation.[332] They also oblige States to ensure prompt and adequate compensation for transboundary damage caused by hazardous activities. They oblige the operator to maintain financial coverage to cover his liability for claims for compensation and they oblige the State of origin to ensure additional compensation to supplement the liability of the operator.[333] Finally, every State is obliged to adopt the necessary legislation and regulatory and administrative measures to implement the principles and to apply them within its regulatory regime without any discrimination.[334]

Despite the fact that the Draft Principles are non-binding, they provide States with a guideline to formulate a legal framework of national and international regulatory systems on liability and compensation for damage caused by hazardous activities as lawful activities allowed by international law. They are aimed at providing adequate and equitable compensation for damage caused by lawful activities.[335] Moreover, the Principles do not support the absolute liability of the State, unless it has engaged in a hazardous activity as an operator. This can be deduced from the commentaries to the Principles which state that '[i]t is envisaged that a State could be an operator for purposes of the present definition'.[336] They also stated that '[t]he lack of any serious consideration of State liability may be understood in the context of the prior articles on prevention: failure to fulfil the due diligence duty to prevent is considered to breach an international obligation and shifts the applicable legal regime to one of State responsibility'.[337] This is why the Principles embodied the principles of civil liability more forcefully than those of international liability. Accordingly, the ILC did not recommend that States develop them in the form of a convention as in the case of the 2001 Draft Articles on State Responsibility for Wrongful Acts.

Moreover, despite the fact that the principles govern liability for damage caused by hazardous activities based on the absolute or strict liability of the State or the operator of the activity, they embody a number of international obligations which are subject to the application of State responsibility for wrongful acts if they are violated. Therefore, it is not surprising that these Principles refer to State responsibility in the Preamble. In addition, the provisions of the principles are very simple and do not comprehensively cover

[332] Principle 6 of the 2006 ILC Draft Principles on the Allocation of Loss.
[333] Principle 4 of the 2006 ILC Draft Principles on the Allocation of Loss.
[334] Principle 8 of the 2006 ILC Draft Principles on the Allocation of Loss.
[335] Kiss & Shelton in Ndiaye and Wolfrum (eds.), 2007, at p. 1139.
[336] UN Doc. A/CN.4/L/693/ Add.1, 41, para. 33, cited in Kiss & Shelton, 2007, at p. 139.
[337] Kiss & Shelton in Ndiaye and Wolfrum (eds.), 2007, at p. 1140.

the issues of liability for lawful activities as in the case of the Draft Articles on State Responsibility for Wrongful Acts. Finally, the Draft Principles on the allocation of loss introduced the elements of civil liability in the regime of international liability. These are considered completely different from those of international liability in procedural and substantive terms. This is due to the fact that the member States of the ILC, particularly the industrialized countries, rejected international liability for damage caused by these activities. This reduces the significance of the Principles for their application to environmental damage caused by nuclear activities which are governed by a special regime including similar provisions. The Principles would be a very significant instrument in relation to environmental damage caused by nuclear activities if they applied to the State as an international subject rather than a private entity.

8.4.3 Similar environmental conventions

Some conventions which deal with environmental matters apply strict civil liability to environmental damage caused by nuclear activities. The 1993 Lugano Convention in particular emphasizes 'the desirability of providing for strict liability in this field taking into account the "Polluter Pays" Principle […] in particular to prevent damage and to deal with damage caused by nuclear substances and the carriage of dangerous goods'.[338] The purpose of this Convention is to ensure adequate compensation for damage to the environment resulting from dangerous activities and to provide means of prevention and reinstatement of the environment to its previous condition.[339] However, this Convention does not apply to environmental damage resulting from nuclear substances caused by a nuclear accident where the Paris Convention and the Vienna Convention and their related instruments are applied, or if nuclear liability legislation governed by internal law is in favour of the victims of environmental damage.[340] According to the Convention, the operator who is in control of a dangerous activity is liable for environmental damage resulting from an accident caused by such activity. The Convention also imposes joint and several liability on all operators who are in control of a dangerous activity, but the liability is only attributed to an operator for part of the damage if he proves that he was in control of the activity only when that part of the damage occurred.[341] However, the operator is not liable for envi-

[338] See the Preamble of the 1993 Lugano Convention on Civil Liability for Damages Resulting from the Exercise of Activities Dangerous for the Environment.
[339] Article 1 of the 1993 Lugano Convention.
[340] Article 4 (2) of the 1993 Lugano Convention.
[341] Article 6 of the 1993 Lugano Convention.

ronmental damage caused by a dangerous activity if the damage was caused as a result of an act of war, hostilities, civil war, natural catastrophe, an intentional act of a third party, compliance with a specific order or compulsory measures by the public authority, a tolerable level of pollution or a dangerous activity operated lawfully in the interest of the injured person, where it was reasonable to expose him to the risk of that activity.[342]

The 1999 Basel Protocol also established a comprehensive civil liability regime for compensation for environmental damage[343] which can be applied to environmental damage caused by nuclear wastes. This Protocol was adopted in response to the 1989 Basel Convention.[344] That Convention aims at the protection of human health and the environment from the adverse affects resulting from the generation and management of hazardous wastes and other wastes. However, the Basel Protocol aims to provide adequate and prompt compensation for damage caused by the transboundary movement of hazardous wastes and other wastes, including damage resulting from the illegal traffic of such wastes.[345] The Protocol imposes strict liability on the person who gives notification of the transboundary movement of hazardous wastes and other wastes in accordance with Article 6 of the Basel Convention. However, the liability is transferred to the disposer once the wastes are in his possession.[346] The Protocol provides for financial limits for the liability to be determined by national law based on the amount of wastes and potential risk involved in accordance with Article 4 of the Protocol which determines the strict liability of the person liable for the damage.[347] The Protocol also establishes a financial mechanism to ensure additional and supplementary compensation, as well as prompt and adequate compensation in the case of an accident caused by such wastes.[348] Moreover, the Protocol imposes an obligation upon the Contracting Parties to establish the necessary legislative,

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[342] Article 8 of the 1993 Lugano Convention.

[343] Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal, available at: http://www.basel.int/pub/protocol.html (accessed on 18.4.2012).

[344] The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, available at: www.basel.int (accessed on 27.4.2011). The negotiations on the Protocol started in 1993 and were completed and adopted on 10 December 1999. Article 12 of Basel Convention provides that '[t]he Parties shall co-operate with a view to adopting, as soon as practicable, a protocol setting out appropriate rules and procedures in the field of liability and compensation for damage resulting from the transboundary movement and disposal of hazardous wastes and other wastes'.

[345] Article 1 of the 1999 Basel Protocol.

[346] Article 4 of the 1999 Basel Protocol.

[347] Annex B of the 1999 Basel Protocol.

[348] Article 15 of the 1999 Basel Protocol.

regulatory and administrative measures to implement its provisions and to inform the Secretariat of measures to be taken to implement the Protocol.[349] Nevertheless, it does not explicitly involve provisions which apply to damage caused by the disposal of nuclear wastes. However, it may implicitly apply to such damage because nuclear wastes fall under the category of hazardous waste, particularly low-level radioactive waste which can easily be disposed of in other countries, particularly in the developing countries which may result an environmental catastrophe.[350] It was also criticized by some States and NGOs because it does not provide an adequate and permanent compensation mechanism.[351] Moreover, it does not reflect the polluter pays principle, which channels liability for environmental damage caused by hazardous activities to the source of the damage, i.e., the exporters of the wastes, as the liability is transferred to the person who is in possession of the waste.[352]

The principle of strict liability was also included in several other conventions on liability for environmental damage and pollution caused by hazardous activities. These conventions deal with the strict liability of the operator of the activities, which include offshore pollution, the transport of dangerous goods, pollution caused by means of transport and transboundary movements of hazardous wastes. It was explicitly referred to in some conventions and implicitly in others.[353] The principle was also included in the 1989 Convention (CRTD) related to liability for damage caused during the carriage of dangerous material

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[349] Article 10 of the 1999 Basel Protocol.

[350] The Council of Ministers of the Organization of African Unity adopted Resolution 26 to prohibit dumping of nuclear wastes and other industrial wastes in Africa and considers it as a crime against Africa. It also obliges the corporations and enterprises responsible to eliminate the wastes and clean up contamination and pollution caused to the environment. T. R. Subramanya, "The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal of 1989 and Related Developments: An Overview", in: Ind.JIL, Vol. 46, No. 3, 2006, pp. 406-428, at p. 414.

[351] Subramanya, Ind.JIL, Vol. 46, No. 3, 2006, at p. 425.

[352] Subramanya, Ind.JIL, Vol. 46, No. 3, 2006, at p. 426.

[353] In oil pollution, for instance, Article III (1) of the 1969 International Convention on Civil Liability for Oil Pollution Damage holds the owner of the ship in case of an accident 'liable for any pollution damage caused by oil which has escaped or been discharged from the ship as a result of the incident'. This Convention was signed on 29 of November 1969, entered into force on 19 June 1975. See, 973 UNTS 3, (1975), reproduced in 9 ILM 49 (1970). See also the 1976 Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration for and Exploitation of Seabed Mineral Resources, done in a conference held in London in October 1975 and December 1976 and signed on May 1, 1977, Article 3, available at: http://folk.uio.no/erikro/WWW/HNS/Civil%20Liability%20offshore.pdf (accessed on 13.4.2012).

inside the country by road, rail, and vessels.[354] According to this Convention, 'the carrier at the time of an incident shall be liable for damage caused by any dangerous goods during their carriage by road, rail or inland navigation vessel'.[355] The principle of strict liability is also included in a number of conventions related to civil liability for damage caused by aviation. It was supported by the Rome Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface.[356] Article 1 of this Convention establishes the liability for damage caused by an aircraft upon proof that any person has suffered damage as a result of an aircraft accident.[357] Reference to these conventions is important to emphasize on the principle of the strict liability of the operator for environmental damage. This is because, after the 1971 Convention on maritime carriage of nuclear material, the carrier or the owner is no longer liable for nuclear damage caused during maritime transport unless the operator is not liable for such damage under the Paris or the Vienna Convention or under national legislation in the interest of the victims.

Similarly, Directive 2004/35/CE established a legal framework to prevent and remedy environmental damage.[358] The Directive imposes public liability,

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[354] Convention on Civil Liability for Damage Caused During Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD), Geneva, 10 October 1989, available at: http://www.transportrecht.org/dokumente/CRTDengl.pdf (accessed on 7.7.2011).

[355] Article 5 (1) of the CRTD.

[356] See, for instance, the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface (Rome Convention 1952). The Convention was adopted in Rome, on 7 October 1952 and came into force on 4 February 1958, after the deposit of ratification of the States of Egypt, Canada, Luxembourg, Spain and Pakistan. For the text of this Convention see, UNTS, Vol. 310, p. 181, available also at: http://www.dot.gov/ost/ogc/Rome1952.pdf (accessed on 3.4.2012).

[357] Article 1 (1) of the Rome of 1952 provides that '[a]ny person who suffers damage on the surface shall, upon proof only that the damage was caused by an aircraft in flight or by any person or thing falling there from, be entitled to compensation as provided by this Convention'.

[358] The Environmental Liability Directive (Directive 2004/35/CE) entered into force on 30 April 2004 in the EU Member States which had three years to incorporate it into their domestic law. This consolidation was completed by the last Member State by July 2010. Up to now, the Directive has already been applied to 50 cases in Europe and has been amended twice. The Directive was amended by Directive 2006/21/EC on the management of waste from extractive industries, which broadened the scope of strict liability by adding "management of extractive waste" as a dangerous activity to the list of dangerous occupational activities in Annex III of the 2004 Directive. Directive 2004/35/CE was also amended by Directive 2009/31/EC on the geological storage of carbon dioxide and amended several directives and added "operation of storage sites" as a dangerous activity and also included responsibility and financial security provisions separate from the 2004 Directive. See Environmental Liability at:

not private individual liability, for environmental damage in the European countries. It imposes strict liability upon the operator of a hazardous activity for environmental damage caused by the activity based on the polluter pays principle.[359] However, this Directive, as mentioned above, does not apply to environmental damage caused by a nuclear accident when the nuclear liability conventions and the EURATOM Treaty are applicable.[360] According to Article 4 (4) of the Directive, '[t]his Directive shall not apply to such nuclear risks or environmental damage or imminent threat of such damage as may be caused by the activities covered by the Treaty establishing the European Atomic Energy Community or caused by an incident or activity in respect of which liability or compensation falls within the scope of any of the international instruments listed in Annex V, including any future amendments thereof.' According to this Annex V of the Directive, these instruments include the 1960 Paris Convention and the 1963 Brussels Supplementary Convention and their amendments, the 1963 Vienna Convention and its amendments, the 1997 Convention on Supplementary Compensation for Nuclear Damage, the 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention and the 1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Mate-

http://ec.europa.eu/environment/legal/liability/index.htm (accessed on 26.4.2012) Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage. Official Journal L 143/56 30/04/2004, also available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:143:0056:0075:en:PDF (accessed on 26.4.2012); Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC - Statement by the European Parliament, the Council and the Commission. Official Journal L 102/15, 11/04/2006 P. 0015 – 0034, available also at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006L0021:EN:NOT (accessed on 26.4.2012); Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No. 1013/2006 (Text with EEA relevance). Official Journal L 140/114, 05/06/2009 P. 0114 – 0135, available also at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0031:EN:NOT (accessed on 26.4.2012).

[359] Ludwing Krämer, "EU Environmental Law", Sweet & Maxwell Publishers, London, 2011, at pp. 173-177.

[360] Stephen Tromans, "Nuclear Law: The Law Applying to Nuclear Installations and Radioactive Substances in Its Historic Context", Hart Publishing, Oxford and Portland, Oregon, UK, 2010, at p. 186.

rial.[361] Accordingly, the Directive will apply in the absence of any of these instruments applicable to environmental damage caused by a nuclear accident.

8.5 Strict liability and the 'Polluter Pays' Principle

The idea of strict liability corresponds to the same concept of liability under the polluter pays principle.[362] This principle is one of the significant applications of the principle of strict liability.[363] It was developed by the OECD and based on its 1972 Recommendation of the Council on Guiding Principles Concerning the International Economic Aspects of Environmental Policies

[361] For references to these instruments and the European law, Norbert Pelzer (ed.), Europäisches Atomhaftungsrecht im Umbruch (European Nuclear Liability Law in A Process of Change, Tagungsbericht der AIDN/INLA-Regionaltagung am 30 Juni und 1. Juli 2009 in Berlin, Nomos Verlagsgesellschaft, Baden=Baden 2010; Roh Hathlia, "The 2004 Paris Convention - The Issue of Third Party Liability Insurance and a Methodology for Calculating the Premium for Environmental Heads of Damages: A UK Perspective", in: Pelzer (ed.), INLA, 2010, pp. 75-86; Mahieu, 2010, pp. 87-92; Patrick Reyners, "Liability Problems Associated with the Current Patchwork Nuclear Liability Regime within the EU States", in: Pelzer (ed.), 2010, pp. 93-104; Ulrich Magnus, "Jurisdiction and Enforcement of Judgments under the Current Nuclear Liability Regimes within the EU Member States", in: Pelzer (ed.), INLA, 2010, pp. 105-122; Evelyne Ameye, "Legal Study on Nuclear Third Party Liability for DG TERN of the European Commission", in: Pelzer (ed.), 2010, pp. 147- 156; Vanda Lamm, "The Unification of Nuclear Liability Law within the EU Member States from the Viewpoint of a Party to the Vienna Convention", in: Pelzer (ed.), 2010, pp. 213-220; Florence Touitou-Durand, "The Convention on Supplementary Compensation for Nuclear Damage: A Solution for Europe?" in: Pelzer (ed.), 2010, pp. 257-276.

[362] For the Polluter Pays Principle see, OECD/NEA, "The Polluter Pays Principle: Definition, Analysis, Implementation", OECD Paris 1975; Viikari, 2008, at pp. 184-202; Henri Smets, "The Principle Pays Principle in the Early 1990s", in: Luigi Campiglio, Laura Pinescalco, and Tullio Treves (eds.), The Environment After Rio: International Law and Economics, Graham & Trotman/Martinus Nijhoff, London/Dordrecht/Boston, 1994, pp. 131-147; Sadeleer, 2002, at pp. 21-60; Patricia Birnie, "Protection of the Marine Environment: The Public International Law Approach", in: De La Rue (ed.), 1993, pp. 1-22, at p. 9; Ian Mann, "A Comparative Study of the Polluter Pays Principle and Its International Normative Effect on Pollutive Processes", 2009, pp. 1-27, available at: http://www.consulegis.com/fileadmin/downloads/thomas_marx_08/Ian_Mann_paper.pdf (accessed on 28.2.2012); Sands, 2000, at p. 376.

[363] Matthew Humphreys, "The Polluter Pays Principle in Transport Policy", in: ELR, Vol. 26, No. 5, 2001, pp. 451-467, at pp. 454-455.

which was adopted on 26 May of 1972.[364] These Guiding Principles were concluded in the 1974 OECD Recommendation on the Implementation of the Polluter Pays Principle and contains the basis for the coordination among States to implement the Polluter Pays Principle. The 1974 OECD Recommendation induces the States to implement the 1972 Guiding Principles.[365] To ensure that the environment is protected under acceptable conditions, the Principle obliges the polluter to bear expenses of the measures decided by the public authorities of the State to prevent, reduce or control environmental damage.[366]

The reason for promoting of the Polluter Pays Principle is purely economic.[367] It is aimed at internalizing the cost of remedying environmental damage.[368] In other words, the Principle shifts the cost of remedying damage caused to the environment by a hazardous activity to the author of the damage or the source of the damage. Internalizing the liability under this principle is justified by the fact that the person who operates an ultra-hazardous activity and profits from it must also bear the economic cost of remedying the harmful consequences caused to the environment by such activity.[369] This is because everything has a value and no one can gain something for nothing.[370] In this sense the Polluter Pays Principle integrates the social and environmental costs and the costs of production, regardless of where the

[364] Recommendation of the Council on Guiding Principles Concerning the International Economic Aspects of Environmental Policies, 26 May 1972, available at: http://www.ciesin.org/docs/008-574/008-574.html (accessed on 1.3.2012).

[365] The Recommendation is available at: http://sedac.ciesin.columbia.edu/entri/texts/oecd/OECD-4.09.html (accessed on 25.4.2012); http://acts.oecd.org/Instruments/ShowInstrumentView.aspx?InstrumentID=11&Lang=en&Book=False (accessed on 24.4.2012); the OECD formulated the Polluter Pays Principle in its declaration of 1975; NEA, 1975, at pp. 18-20.

[366] The Polluter Pays Principle, para. 4; Roy E. Cardato, "The Polluter Pays Principle: A Proper Guide for Environmental Policy", at p. 1, available at: http://iret.org/pub/SCRE-6.PDF (accessed on 24.2.2012).

[367] Nuclear Energy Agency, Steering Committee for Nuclear Energy, Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy, Summary Record of the Meeting held in Paris from 21st to 24th November 1988, NEA Doc. SEN/LEG (89)1, Paris, drafted: 24th January 1989, dist: 24th January 1989, para 39, at p. 8.

[368] NEA, Liability and Compensation for Nuclear Damage, 1994, at p. 20; Peter H. Sand, "Transnational Environmental Law Lessons in Global Change", International Environmental Law and Policy, Series, Vol. 53, Kluwer Law International, The Hague-London-Boston, 1999, at p. 49.

[369] Australia and Ireland, Non-paper "Civil Nuclear Liability", SCNL/11/1, 15 March 1995, at p. 7.

[370] Humphreys, ELR, Vol. 26, 2001, at p. 452.

production takes place.[371] These costs include the costs of preventive measures taken or to be taken to prevent damage caused to the environment and the restoration of the environment to its previous condition. In the case of a nuclear accident, these costs may include the costs of prevention of the accident and the costs of preventive measures taken after the accident, such as costs of cleaning up, decontamination and removing the contaminated products.[372]

Consequently, the concept of the Polluter Pays Principle is similar to the concept of strict liability as adopted by the nuclear liability conventions[373] and the oil liability conventions[374] and other instruments.[375] The Principle

[371] Philippe Sands et al., "International Environmental Law: Emerging Trends and Implications for Transnational Corporations", United Nations, New York, 1993, at p. 25.

[372] SEN/LEG (89)1, para 39, at p. 9.

[373] Article 3 of Paris Convention; Articles II and IV of Vienna Convention; Article II. 1 of Brussels Nuclear Ships Convention; Article 6 (1) of the agreement between the Federal Republic of Germany and Brazil concerning the entry of nuclear ships into Brazilian waters and their stay at Brazilian ports. The agreement was signed in Brasilia on 7 June 1972; Article I (1) (4) of the agreement of 18 June between the United States of America and Ireland concerning Exchange of notes constituting an agreement relating to public liability for damage caused by the N. S. Savannah; Article VIII of the agreement of 23 November 1964 between the Government of the United States of America and the Government of Italy on the Use of Italian ports by the N. S. Savannah. UNTS, Vol. 532, at p. 133; Article 13 of the 27 May 1970 Agreement between Liberia and Germany concerning the use of the Liberian ports by the N. S. Otto Hahn. See the agreement of 27 May 1970 between Germany and Liberia on the Use of Liberian Ports by N. S. Otto Hahn.

[374] See Article III (1) of the 1969 International Convention on Civil Liability for Oil Pollution Damage signed in Brussels on 29 November 1969. See 973 UNTS 3, reproduced in 9 ILM 45, (1970), also available at: http://www.admiraltylawguide.com/conven/civilpol1969.html (accessed on 7.7.2011); Article 5 (1) of (CRTD).

[375] See, for example, Article 1 (1) of the 1952 Rome Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface; Article VII of Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. The Treaty was adopted and opened for signature in Moscow, London and Washington, on 27 January 1967 and entered into force on 10 October 1967. See UNTS, Vol. 610, at p. 206, also available at: http://www.oosa.unvienna.org/oosa/SpaceLaw/gares/html/gares_21_2222.htm (accessed on 7.7.2011); Article II of the 1972 Convention on International Liability for Damage Caused by Space Objects. For the text of the Convention, see (draft of the Convention, 10 ILM 1971, at p. 965); AJIL, No. 66, 1972, at p. 702; Hurwitz, 1992, pp. 211-219; Elbaradei, Nwogugu and Rames, 1993, at p. 1301. Paragraph 5 of the Resolution Adopted by the General Assembly, 1962 (XVIII). Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, adopted in 1280th 1963 plenary meeting, 13 December 1963, available at: http://www.oosa.unvienna.org/oosa/SpaceLaw/gares/html/gares_18_1962.html (accessed

lays the burden of remedying damage caused to the environment on the source of the damage in the same way as these instruments. The Principle has a wider application in the national law systems. In fact, the Principle is an application of the strict liability theory, as strict liability for nuclear damage has been recognized by international conventions and implemented by national legislations, even before the Principle was adopted. The Polluter-Pays Principle has also been recognized by numerous of international instruments related to the environment such as the 1992 Rio Declaration on the environment and the EU Treaty. According to Principle 16 of the Rio Declaration:

> 'National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment'.

According to Article 191 (2) of the Treaty on the Functioning of the European Union, the 'Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay'.[376]

Nevertheless, there is a difference between the Polluter Pays Principle and the strict liability principle under the nuclear liability conventions, since

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on 8.5.2015); Paragraph 8 of the UNGA resolution No. 37/92 on Principles Governing the Use by Artificial Earth Satellites for International Direct Television Broadcasting, adopted by the UNGA at its 100th plenary meeting on 10 December 1982, available at: http://www.un.org/documents/ga/res/37/a37r092.htm (accessed on 7.7.2011); Principles 8 and 9, the UNGA resolution No. 47/68 on Principles Relevant to the Use of Nuclear Power Sources in Outer Space, adopted by the UNGA at its 85th plenary meeting, 14 December 1992, available at: http://www.dipublico.com.ar/english/treaties/declaration-of-principles-relevant-to-the-use-of-nuclear-power-sources-in-outer-space-unga-resolution-4768/ (accessed on 10.4.2012).

[376] The Lisbon Treaty, Consolidated Version of the Treaty on the Functioning of the European Union, adopted in Lisbon on 13 December 2007, entered into force on 1 December 2009, 9.5.2008, EN, Official Journal of the European Union, C 115/47, available at: http://www.lisbon-treaty.org/wcm/ (accessed on 11.4.2012); http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:115:0047:0199:EN:PDF (accessed on 11.4.2012); Official Journal of the European Union, 30.3.2010, EN, C 83/47, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:FULL:EN:PDF (accessed on 27.4.2012).

the first is applicable to environmental damage in general including environmental nuclear damage, while the strict liability principle under the nuclear liability conventions applies to nuclear damage caused by nuclear activities including environmental damage. In other words, the Polluter Pays Principle applies to damage caused to the environment by nuclear and non-nuclear activities, while the nuclear liability conventions apply to damage caused to the environment by a nuclear activity. Furthermore, the costs of remedying environmental damage caused by a nuclear accident under the nuclear liability conventions are paid by the operator of a nuclear installation and by additional compensation provided by the State. However, the costs of remedying environmental damage caused by a hazardous activity under the polluter pays principle are paid by the source of the damage. This means that the operator of the activity will bear costs of the remedy alone, without sharing them with the Installation State.

The Polluter Pays Principle is undoubtedly considered as one of the principles of the civilized nations which form a source of international law, as provided in Article 38 (1) (c) of the ICJ Statute. This Principle has been developed as a general principle of law by the civilized nations. Nevertheless, the doctrine of international law does not accept the principle as a principle of customary international law. As Sands pointed out, the Polluter Pays Principle is not internationally accepted as a principle of customary international law, and was only accepted by the EU, the UN/ECE and the OECD countries. He argued that '[t]he polluter pays principle has not received the broad geographical and subject matter support over the long term accorded to the precautionary principle in recent years. It is doubtful whether it has achieved the status of a generally applicable rule of customary international law, except perhaps in relation to states in the E[U], the UN/ECE and the OECD'.[377] However, there is a growing sense that the acceptance of the principle in its current form 'might provide supplementary evidence of both State practice and *opinio iuris* necessary to determine the emergence or existence of the stipulated customary norm'.[378] In fact, in our opinion, the Polluter Pays Principle will not be accepted as a principle of customary international law unless the principle of strict liability is widely accepted by States first as a principle of customary international law. This is because the Principle is considered to reflect the strict liability theory. The basis of the two principles under customary international law remains a matter of dispute for the doctrine of international law, as there is only limited support by States for it as customary international law. The concentration of liability in the domestic

[377] Sands, 1994, at p. 213 and 2003 edition, at p. 280.
[378] Horbach, 1996, at p. 7.

system of liability explains the rapid acceptance of principle by the States as a general principle of law. However, it takes a long time for a principle to be accepted as a customary norm and the psychological and material elements must arise many times.

8.6 The relationship between strict civil nuclear liability regimes and the general rules of international law: Strict State liability and wrongful act responsibility

In general, as mentioned, liability for environmental damage caused by a nuclear accident has been based in the nuclear liability conventions on the strict liability of the operator of a nuclear installation. Despite this, the relationship between these conventions and the general rules of international law cannot be totally ignored. These conventions govern liability for nuclear damage under private international law and are applied by regimes of national law rather than international law. At the same time, they are considered as a source of international liability of the Contracting Parties according to Article 38 (1) (c) of the ICJ Statute. This is because the Conventions contain a number of substantive and procedural obligations which have to be fulfilled by the Contracting Parties.[379] Furthermore, the principle of strict liability as adopted by the nuclear liability conventions is one of the principles of the civilized nations in accordance with this Article. This creates a relationship between the two branches of international law in relation to the application of the nuclear liability conventions. These conventions set forth a general rule under which wrongful act responsibility is applicable. Accordingly, the nuclear liability conventions do not affect the rights and obligations of the Contracting States under the general rules of international law in relation to nuclear damage.[380] This means that the State can resort to international law if claims of nuclear damage have a basis in international law. This also indicates that the application of the general rules of public international law is outside the scope of application of the nuclear liability regime of the Conventions,[381] and it means that wrongful act liability is applicable in case of a violation of a provision of the nuclear liability conventions or of the general rules of international law in relation to a nuclear activity. A breach

[379] IAEA, INLEX, 2004, at p. 25; IAEA, ILS, No. 3, 2007, at p. 24.
[380] Article XVIII of the Vienna Convention; Article XVIII (1) of the Amended Vienna Convention; and Annex II of the Paris Convention; Article XV of the Vienna Convention on Supplementary Compensation.
[381] IAEA, INLEX, 2004, at p. 25; IAEA, ILS, No. 3, 2007, at p. 24.

of these obligations constitutes wrongful act responsibility which applies under international law.

There are a number of cases which indicate the rights of a State to resort to the general rules of international law concerning the breach of obligations of the State under the general rules of international law. Frequent references have been made to these throughout the study. As chapter 5 indicated, the Installation State must fulfil some international obligations if a nuclear installation operates in its territory or under its jurisdiction or control, even it is operated by a private operator. For instance, the failure of a Sate to observe due diligence to prevent nuclear damage means that regime of liability applies to unlawful rather than lawful activity, which entails applying State responsibility for wrongful acts. In such cases, wrongful act liability is applicable in the arena of public international law rather than private international law because private operators are not subjects of international law. It was stated that:

> 'Only the state's own obligations are in issue here. Private parties or companies are not in general bound by public international law, although as we shall see […], the practice of channelling environmental liability towards private actors in national law is now a widely developed alternative to the international liability of states in cases of pollution damage. But the problem of attributing private conduct to states will seldom impinge on responsibility in international law for non-performance of the state's own environmental obligations. Even where an activity causing environmental harm is conducted by private parties, as in the *Trail Smelter* case, the issue remains one of the state's duty of control, co-operation, or notification, which cannot be avoided by surrendering the activity itself into private hands'.[382]

The Installation State violates rules of international law if it does not take care of and supervise the application of nuclear safety standards adopted by international instruments or by international organizations. In these cases, it is difficult to apply strict liability because there is no actual damage that has been caused by the activity to attribute the liability to the operator or to the Installation State. However, liability is incurred by the State as a result of the violation of nuclear safety standards which may cause actual damage as the result of the nuclear activity. It was stated that:

> 'A contemporary development in respect of certain activities likely to cause damage by technological or industrial means consists in defining objectively, in minute detail, by means of technical annexes or recommendations, the specific requirements to be fulfilled in order to comply with the duty of "due diligence". […] IAEA recommendations indicate the technical requirements in

[382] Birnie and Boyle, 2002, at p. 182.

> preventing unintended nuclear radiation. […] The demonstration of any lack of due diligence is thus made easier, since the violation of any of these technical requirements constitutes by itself the basis for responsibility'.[383]

Moreover, the measures of exchange of information, notification, consultation and assistance in the case of a nuclear accident are also of primary importance with regard to protecting the environment. The 1986 Conventions on early notification and assistance in the case of a nuclear accident oblige the Contracting Parties to provide early notification and prompt assistance in the case of a nuclear accident. The violation of these obligations by a Contracting State to these Conventions incurs State responsibility for wrongful acts. Furthermore, the State is obliged to control a nuclear activity and to ensure that this activity does not cause nuclear damage to the environment, e.g., by the dumping of radioactive wastes into the sea in violation of rules of international law. The nuclear liability conventions do not cover liability for nuclear damage caused as a result of dumping radioactive waste at sea. However, dumping radioactive waste at sea is allowed under international conventions only under certain conditions established by international organizations, viz. the IAEA and the NEA. The violation of these standards by a State is unlawful.

> 'Responsibility in such cases is neither strict nor absolute since it cannot be established by proof of damage alone. But where nuclear damage is the result of some internationally prohibited activity, such as the dumping of radioactive waste at sea, or atmospheric nuclear tests, objective responsibility results not from a failure of due diligence, but simply from the harm caused in deliberate violation of international law. This is much closer to a standard of strict or absolute responsibility, and offers a sounder basis for such concepts than any inferences from national law or civil liability conventions'.[384]

Similarly, there are a number of cases in the nuclear liability conventions that entail the application of the general rules of public international law. The regime of the Amended Vienna Convention refers to the application of the Convention being excluded for nuclear damage suffered in the maritime zones of Contracting Parties, but it does not determine such maritime zones. It leaves the determination of these maritime zones to the Contracting Parties according to the general rules of international law.[385] Therefore, disputes

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[383] Aréchaga, and Tanzi, 1991, at pp. 352-353.

[384] Birnie and Boyle, 2002, at p. 473.

[385] Maritime zones under the law of the sea include the territorial sea, contiguous zone, exclusive economic zone, continental shelf and high seas. These maritime zones are governed by a number of international conventions. These conventions are the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone, the 1958 Geneva Conven-

arising from the delimitation of maritime boundaries are left to be decided outside the scope of the nuclear liability conventions.[386] Another example is the regime of the Amended Vienna Convention which imposes an international obligation upon the Installation State vis-à-vis the Contracting Parties to fulfil its financial obligations if it determines the liability of the operator at less than 300 million SDRs or not less than 100 million SDRs during a transitional period, provided that the reduced amount of liability is available from public funds. The Installation State would be liable under international law if it violated this obligation.[387] Furthermore, each Contracting State to a nuclear liability convention is obliged vis-à-vis the other Contracting Parties to implement the provisions of the convention in its national law and to comply with these provisions or to apply the convention itself. A violation of this obligation entails State responsibility for wrongful acts under international law. Another case in the nuclear liability conventions oblige the operator and the Installation State to pay the costs of the necessary measures to prevent and reduce the harmful consequences if the environment is impaired by a nuclear accident. Moreover, the nuclear liability conventions oblige the Contracting Parties to settle the disputes arising from the interpretation or application of provisions of the conventions by peaceful means.[388] The peaceful means for the settlement of disputes are determined under the general rules of international law.[389] A breach of such an obligation by a State

tion on the Continental Shelf, the 1958 Geneva Convention on the High Sea and the 1982 United Nations Convention on the Law of the Sea. However, the latter Convention covers all maritime zones. Therefore it appeals to the Law of the Sea. For the texts of these conventions, see the United Nations Convention on the Law of the Sea of 10 December 1982 (28 July 1994): A/RES/48/263 and for agreements relating to the implementation of the Convention see (33 ILM 1309), http://www.globelaw.com/LawSea/lsconts.htm; Convention on the Territorial Sea and the Contiguous Zone, done at Geneva, on 29 April 1958, came into force on 10 September 1964; http://sedac.ciesin.org/entri/texts/territorial.contiguous.zone.1958.html; U.N.T.S. No. 7477, Vol. 516, 1964, pp. 205-225; Convention on the Continental Shelf, done at Geneva on 29 April 1958, available at: http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_1_1958_continental_shelf.pdf (accessed on 11.4.2012); Convention on the High Sea, done at Geneva on 29 April 1958, UNTS, Vol. 450, p. 11, p. 82, available at: http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_1_1958_high_seas.pdf (accessed on 13.4.2012).

[386] Article 17 (d) of the Amended Paris Convention.

[387] IAEA, INLEX, 2004, at p. 25; IAEA, ILS, No. 3, 2007, at p. 24.

[388] Article XX A of the Amended Vienna Convention; Article XVI of the Vienna Convention on Supplementary Convention.

[389] Declaration on Principles of International Law Concerning Friendly Relations and Co-operation Among States in Accordance with the Charter of the United Nations,

entails State responsibility for wrongful acts. The nuclear liability conventions oblige the Installation State to ensure that financial security is maintained by the operator of a nuclear installation before commencing the operation of the installation. The Installation State is also obliged to guarantee compensation to victims who have suffered from environmental damage caused by a nuclear accident. It violates its obligations under the conventions if it has allowed the operation of a nuclear installation without the operator maintaining financial security. For example, the 1962 Nuclear Ships Convention obliges a Contracting State to take the necessary measures to prevent the operation of nuclear ships flying its flag without being registered or authorized.[390] Thus the Contracting State violates the obligations of the nuclear liability conventions if a nuclear installation or a nuclear ship is operated without the operator maintaining financial security or is operated without a licence from the competent authorities.

8.7 Conclusions

The chapter shows that liability for environmental nuclear damage under international law is based only on the idea of strict liability because fault liability and other bases of liability are unsuitable for liability for environmental nuclear damage caused by nuclear activities. Hazards arising from the use of nuclear energy as a hazardous activity meant that States had to accept strict liability in the nuclear liability conventions as a basis for liability for nuclear damage caused by nuclear energy. Strict liability is based on objective liability under which victims of a nuclear accident are only required to prove causality, i.e., to prove only that the damage was caused by a nuclear activity. However, fault liability is based on the subjective liability, which is based on the personal liability of the author of the damage, and the victim is required to prove his intention in causing the damage. This is a very difficult task in the field of nuclear liability, as victims of a nuclear accident cannot easily prove the intention of the operator in causing the accident.

However, despite the fact that the States have accepted strict liability as a basis of liability for nuclear damage, they are still reluctant to accept it as a general principle in international law. This chapter discussed the sources and the basis of absolute State liability for environmental nuclear damage caused by a nuclear accident in the light of the general rules of international law. It

adopted by the United Nations General Assembly on 24 October 1970, available at: http://www0.hku.hk/law/conlawhk/conlaw/outline/Outline4/2625.htm; http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/2625%20(XXV) (accessed on 10.4.2012).

[390] Article XV (1) of the 1962 Brussels Nuclear Ships Convention.

discovered that in some cases liability for environmental damage caused by nuclear activities as hazardous activities is attributed to the State in whose territory or under whose jurisdiction or control a nuclear installation is operated, regardless of its fault or negligence or a wrongful act. It also revealed that the general principle of strict State liability still lacks support and is not fully accepted by States.

In treaty law, the only convention in international law that clearly applies strict State liability for environmental damage caused by nuclear activities is the 1972 Convention on liability for damage caused by space objects. This Convention was applied in the Cosmos 954 Case between the USSR and Canada in 1979. Nevertheless, it allows the application of fault liability where environmental damage is caused to other States or in space by a space object operated by a nuclear reactor or nuclear energy source where the damage is caused outside the surface of the earth, and also exonerates the State from liability in some circumstances.

There not much support either for a general principle of strict liability in judicial decisions and State practice. The only judicial case to support strict State liability for environmental damage caused by a hazardous lawful activity is the Trail Smelter case, even though that case is still questionable because it is not clear whether the tribunal based its decision on fault or non-fault liability. In nuclear cases, strict liability on nuclear issues has only been applied to a limited extent, e.g., the Cosmos 954 and Marshall Islands cases in 1954.

Similarly the doctrine of international law is still divided about accepting the principle of strict liability as a principle of general international law or a principle of customary international law. Some jurists reject the principle of strict liability as the basis of State liability in general. Others accept strict State liability to govern liability for damage caused by hazardous activities, but they do not consider it to be a general principle of international law. Others accept strict State liability if it is provided for in an international convention. Finally, some writers accept the principle as a general principle of international law to be applicable only to hazardous activities.

Moreover, the ILC has failed to recognize the principle of strict liability as a general principle for State liability for transboundary environmental damage caused by hazardous activities in general, while it has recognized the principle of State responsibility for wrongful acts which was codified by the ILC in the 2001 Draft Articles on State Responsibility for Wrongful Acts. The ILC recognized strict liability to apply only to the liability of the private operators of hazardous activities, including the liability of the operator of a nuclear activity. The 2006 ILC Draft principles on the allocation of loss contained the same principles of civil liability that were included in

treaty regimes. A breach of these principles constitutes State responsibility for wrongful acts.

Accordingly, strict liability for environmental damage caused by a nuclear accident is in principle still governed by the nuclear liability conventions and other environmental instruments which deal with liability of the operator of a nuclear installation. The nuclear liability conventions apply civil liability under national law regimes. Under these conventions, the operator – or the State when it serves as an operator of a nuclear installation – is liable for environmental damage caused by a nuclear accident according to the national legal regime. The chapter reveals that under nuclear liability legislation, liability for environmental nuclear damage is strict, not absolute. This is because the nuclear liability conventions included a number of exonerations and in some cases some nuclear activities are not covered by the conventions, such as minor nuclear activities, the disposal of waste and the decommissioning of nuclear installations. Moreover, under the conventions liability for nuclear damage is limited in terms of time and amount. In all these cases, the operator of a nuclear installation is exonerated from liability, and consequently victims of nuclear damage are prevented from being compensated under the nuclear liability conventions. This means that under the conventions liability for nuclear damage is strict not absolute. Therefore the term strict liability should replace absolute liability, or these circumstances should be changed so that the liability is absolute.

The principle of strict liability also corresponds to the Polluter Pays Principle. Both principles impose liability for environmental damage caused by ultra-hazardous activities upon the operator of the activity. However, the main difference between the two principles is that the liability under the Polluter Pays Principle is an economic concept which covers only the economic burden of the damage caused to the environment including environmental damage caused by nuclear activities, while the principle of strict liability is a legal concept which covers compensation for nuclear damage including environmental damage. The first channels liability onto the source of the damage, while strict liability channels liability onto the operator of the activity.

Therefore it is difficult to argue that strict liability is the only basis of State liability for environmental damage caused by nuclear activities. It should exist together with State responsibility for wrongful acts, which has an important role in the implementation of strict State liability and the performance of nuclear activities. Wrongful act liability was rejected as the only basis for liability in the field of nuclear liability law because it is difficult to attribute the offence to the operator or the State in the case of a nuclear accident when it carried out with due care. Nevertheless, wrongful act liability is applicable in the case of a violation by the Contracting Parties of principles

and obligations of the State. The Installation State is obliged to respect obligations under the nuclear liability conventions and other obligations under the general principles of international law. A violation of nuclear safety standards as included in international instruments or the dumping of nuclear wastes contrary to the rules of international law, for example, incurs State responsibility for a wrongful act rather than strict State liability. This indicates the relationship between civil nuclear liability regimes and the general rules of international law. Nevertheless, nuclear accidents which occur in nuclear reactors are a clear argument for the State accepting the principle of strict State liability. The Fukushima nuclear accident occurred for all States to see, and showed that the use of nuclear reactors is unsafe and damage caused by a nuclear accident is beyond the capability of any private operator or insurance company.

9 THE LEGAL CONSEQUENCES OF LIABILITY AND RESPONSIBILITY FOR ENVIRONMENTAL DAMAGE CAUSED BY A NUCLEAR ACCIDENT

9.1 Introduction

The previous three chapters showed that the State is responsible for violations of its nuclear and environmental obligations and its failure to prevent and reduce environmental damage caused by a nuclear accident. It is also absolutely liable as the operator of a nuclear installation for environmental damage caused by a nuclear accident to other States, even without the violation of the rules regulating the nuclear activity. This gives rise to the following question. What are the legal consequences of State liability and responsibility for environmental damage caused by nuclear activities?

The legal consequences of State liability and responsibility for such damage actually depend on whether the damage is the result of a lawful or unlawful act or activity. According to international law, the legal consequence of State liability for damage caused by a nuclear activity as a hazardous lawful activity is compensation for the damage suffered as a result of a nuclear accident. The State is obliged to compensate the victims for personal damage, loss or damage to property, economic loss and environmental damage caused by a nuclear accident. This was the approach taken by the nuclear liability conventions, and the 2006 ILC Draft Principles on the allocation of loss caused by hazardous activities, and other international liability regimes which deal with the issues of nuclear and environmental liability under international law.

However, the legal consequences of State responsibility for wrongful acts vary in international law. First, the State is obliged to cease the wrongful act in question if it is in violation of the rules of international law, and to provide assurances and guarantees that it will not be repeated.[1] This is particularly important in relation to the protection of the environment from damage caused by nuclear activities. It puts an end to the continuing violation of a State of the rules which protect the environment and regulate nuclear activities, and subsequently prevents the occurrence of nuclear accidents and their

[1] Article 30 of the 2001 ILC Draft Articles on State Responsibility.

harmful consequences from damaging the environment. The continuing violation of these rules by a State is a risk and constitutes a serious threat of a nuclear accident occurring and causing damage to the environment of other States. Secondly, the State is obliged to make full reparation of damage caused to the injured States by this activity.[2] The aim of reparation is to strike a balance between the interests of the responsible State and the State affected by the obligation that was breached or by a nuclear accident. Thus the cessation of a wrongful act is aimed at preventing damage in the future, while the duty of reparation is aimed at remedying the damage caused in the past.[3] This approach was adopted by the 2001 ILC Draft Articles on State Responsibility for Wrongful Acts.

To explore the legal consequences of State liability for environmental damage caused by a nuclear accident and its responsibility for the violation of nuclear and environmental obligations, the chapter examines these issues on the basis of the general rules of international law as codified by the ILC in its Draft Articles on State Responsibility for Wrongful Acts, international liability for lawful acts and the nuclear liability conventions. This is because, as Boyle noted:

> 'No attempt has yet been made, either in the Commission's articles on State Responsibility, or in those on the prevention of transboundary harm, to develop forms of reparation specifically adapted to particular kinds of damage, such as environmental damage. The remedies available for breach of environmental obligations are thus determined by general international law. Where the responsibility of a state is established, an obligation arises first to discontinue the wrongful conduct, second to offer guarantees of non-repetition, and third to make 'full reparation' for the injury caused'.[4]

The chapter also contains an examination of the legal consequences of lawful and unlawful activities because compensation applies to both.

The chapter is divided into five sections. The following section explains the relationship between State responsibility and liability and its legal consequences, both in general and in particular with regard to environmental damage caused by nuclear activities. Section 9.3 discusses the concept of the cessation and non-repetition of illegal acts and its importance in preventing environmental damage caused by nuclear activities. Section 9.4 examines the reparation of environmental damage as a legal consequence of international liability and responsibility in two subsections. Section (9.4.1) explores the concept and nature of reparation and its objectives in general and its rela-

[2] Article 31 of the 2001 ILC Draft Articles on State Responsibility.
[3] Crawford, Peel and Olleson, EJIL, Vol. 12, No. 5, 2001, at p. 985.
[4] Boyle, 2002, at p. 22.

tionship with the consequences of international liability for environmental damage. Section (9.4.2) investigates forms of reparation as legal consequences of State responsibility and liability for environmental nuclear damage. Finally, section 9.5 contains some concluding remarks. It concludes that compensation is the most relevant form for reparation of environmental damage caused by a nuclear accident and for restoring the environment to its previous condition. However, other forms of reparation are also relevant to prevent and reduce environmental nuclear damage. It also indicates that the legal consequences of international liability have developed with the development of the concept of international liability. The role of State responsibility in relation to the protection of the environment is not only limited to the classical role of liability that is aimed at the reparation of the damage, but is also aimed at preventing a nuclear accident and its harmful consequences.

9.2 The relationship between responsibility and the legal consequences of liability

There is no liability without damage and without liability damage has no legal consequences. The legal consequences in relation to environmental damage caused by nuclear activities therefore follow from the establishment of international liability. Under international law, following the establishment of international liability, a new relationship develops between the responsible State and the injured State.[5] This relationship constitutes the legal consequences of liability and responsibility of the State.[6] This creates a new obligation for the responsible State to bear the legal consequences of repairing

[5] YILC, 2001, Vol. II, Part Two, at p. 88, para. 2, commentaries on Article 29. It stated: 'Following the establishment of an internationally wrongful act, a new legal relation comes into existence between the source state and the injured state. This obligation is governed by the obligation of the source state to make reparation for the internationally wrongful act'. Lefeber, 1996, at p. 132. The same view was expressed by Anzilotti. He stated that: 'When a wrongful act – by which is meant, as a rule, the violation of an international right – is committed, the consequence is that a new relationship comes into existence, in law, between the State to which the act is imputable (that State being under a duty to make reparation) and the State with respect to which there exists an unperformed obligation (this State having a claim to reparation). This is the only effect that the rules of international law, as laid down in the reciprocal undertakings of States, can attribute to the wrongful act…' As quoted by García-Amador, Sohn and Baxter, 1974, at p. 9.

[6] Article 28 of the 2001 ILC Draft Articles on State Responsibility.

the damage. This new obligation gives the injured State the right to claim for reparation.[7]

The duty of reparation is a secondary obligation established as a result of State responsibility for wrongful acts in the case of a violation or the failure to carry out a primary obligation.[8] For example, it obliges a State conducting a nuclear activity which has breached a primary obligation not to cause environmental damage to other States, to bear the burden of responsibility for the breached obligation. According to the 2001 Draft Articles on State Responsibility for Wrongful Acts, the establishment of State responsibility for wrongful act creates three obligations upon the responsible State. The first is that the State must cease the illegal act. Secondly, it must provide assurances and guarantees of the non-repetition of such an illegal act,[9] and thirdly it must repair damage caused by such an illegal act.[10] Accordingly, in the case of State responsibility for a wrongful act committed or omitted in violation of environmental or nuclear obligations, such as the disposal of nuclear wastes at sea in violation of the rules of international law, it must first refrain from performing this act and provide assurance that it will not dispose of other nuclear wastes at sea in violation of international law, and it must compensate, for example, victims who have suffered damage caused by such waste or pay the costs of measures taken to prevent environmental damage and to restore the environment to the *status quo ante*.

However, State responsibility for a wrongful act may require further legal measures by the responsible State and other States if the wrongful act is related to the peremptory norms of general international law or constitutes a serious breach of an international obligation, such as a norm related to the protection of the common environment of the international community.[11] As mentioned, a breach of an obligation by the State may be considered serious if it involves a gross or systematic failure to fulfil the obligation.[12] The legal consequence of a serious breach of an international obligation is that all

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[7] André de Hoogh, "Obligations Erga Omnes and International Crimes: A Theoretical Inquiry Into the Implementation and Enforcement of the International Responsibility of the States", Kluwer Law International, The Hague/London/Boston, 1996, at p. 140; Bodansky and Crook, AJIL, Vol. 96, Issue 4, 2002, at p. 785; Smith, 1988, at p. 48.

[8] Jutta Brunnée, "International Legal Accountability Through the Lens of the Law of State Responsibility", in: NYIL, Vol. XXXVI, 2005, pp. 21-56, at p. 33.

[9] Article 30 of the 2001 ILC Draft Articles on State Responsibility.

[10] Article 31 of the 2001 ILC Draft Articles on State Responsibility.

[11] YILC, 2001, Vol. II, Part Two, at p. 87, para.2, commentaries to Article 28 of the 2001 ILC Draft Articles on State Responsibility.

[12] Article 40 of the 2001 ILC Draft Articles on State Responsibility.

States are obliged to cooperate to prevent a serious breach of international law.[13] They must also refrain from recognizing an illegal situation or from providing assistance to continue an illegal situation.[14] In the absence of an injured State, all States are considered injured States,[15] for example, if the obligation which has been breached by a State is an environmental obligation related to the protection of the environment of the whole international community, or it constitutes an international environmental crime, or it is related to the use of nuclear energy for nuclear weapons. In these cases, all States are obliged not to recognize such acts and not to cooperate with the source State in the performance of such acts.

The duty of reparation is also established as a result of State liability for damage caused by a lawful activity. Liability for damage caused by lawful activities is a primary obligation, which constitutes compensation for the resulting damage as a consequence of liability. As mentioned, liability and compensation for environmental damage caused by a nuclear accident as a result of lawful nuclear activity not prohibited by international law is a primary obligation. Thus reparation for damage is always interrelated with responsibility and liability.

These are the consequences of State responsibility for wrongful acts and liability for damage caused by lawful activities under international law. However, this gives rise to the question of the nature of these legal consequences of State responsibility. In other words, is the obligation of the State to remedy environmental damage a duty or sanction? To answer this question, it can be argued that the obligation to remedy is a duty rather than a sanction.[16] Sanctions as legal consequences of international liability are not applied in international law. International law does not allow the State to use force against the responsible State to meet its international obligations or to force it to repair the damage. In international law, reparation is not considered to be a punishment and the two notions are not the same.[17] It was real-

[13] Article 41 (1) of the 2001 ILC Draft Articles on State Responsibility.
[14] Article 41 (2) of the 2001 ILC Draft Articles on State Responsibility.
[15] YILC, 1985, Vol. II, Part One, at p. 8, paras. 23, 24 and 25.
[16] Branimir M. Jonković, "Public International Law", Transnational Publishers, Dobbs Ferry, New York, 1984, at p. 152.
[17] It was considered that compensation and restitution are forms of reparation. It was argued that: 'Punishment is directed at the past, even if it would ordinarily take away the existence or restrict the freedom of an author of a wrongful act, or compel it to make a financial contribution in the near or distant future. But the essential characteristic of reparation in the strict sense is that its goal consists of establishing the situation that would have existed had the wrongful act not taken place. The measures ordinarily resorted to under the heading of punishment do not in any way contribute to that goal, and hence are to be considered as retribution for wrongful conduct. It is on that basis [that]

ized that the use of force as a punishment is not an effective solution to repair damage caused by the responsible State. Therefore international law does not distinguish between civil and criminal responsibility because there is no authority in international law to implement sanctions in the case of a breach by a State of its international obligations or in the case that it has refused to repair damage caused to other States.[18]

> 'Responsibility is simply the principle which establishes an obligation to make good any violation of international law producing injury, committed by the respondent State. Whether reparation be made through diplomacy or in other manner is a matter of procedure, and an entirely distinct problem. […] Responsibility appears, in principle, at the moment that the internationally injurious act has taken place within the control of the State'.[19]

Thus punishment as it exists in national legal systems does not have a place in the international law of responsibility. According to Article 32 of the ILC Draft Articles on State Responsibility, the responsible State may not rely on the provisions of its internal law as a justification for the failure to comply with its obligations arising as a result of the commission of an internationally wrongful act. According to the commentaries, this Article is different from Article 3 which, as discussed in chapter 7, concerns the role of internal law in describing an internationally wrongful act. This is because 'Article 32 makes clear the irrelevance of a State's internal law to compliance with the obligations of cessation and reparation'.[20] On the other hand, Bothe argues that 'pollution caused in violation of international law should also be considered a violation of internal law and therefore punishable under the national rules'.[21] Furthermore, according to Oppenheim's International Law:

> 'If the delinquent state refuses reparation for the wrong done, the wronged state can, consistently with any existing obligation of specific settlement and with restraints imposed by international law on the threat or use of force, exercise such means as are necessary to enforce adequate reparation. It may happen that a state, while not denying its liability to pay a sum specified by way of damages, may assert that it has insufficient foreign exchange to make the nec-

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one has to view statements to the effect that anything going beyond restitution and compensation would constitute punishment'. Hoogh, 1996, at p. 143.

[18] García-Amador, Sohn and Baxter, 1974, at p. 9; Paul Reuter, Principes de droit international public, in: RDC, 1961, Vol. 103, Part II, pp. 425-651, at p. 586.

[19] Eagleton, 1928, at pp. 22-23.

[20] YILC, 2001, Vol. II, Part Two, at p. 94, para.1, commentaries on Article 32.

[21] Michael Bothe, "Criminal Responsibility for Environmental Damage in Time of Armed Conflict", in: Richard J. Grunawalt, John E. King and Roland S. McClain (eds.), Protection of the Environment during Armed Conflict, International Law Studies, Vol. 69, Naval War College, Newport, Rhode Island, 1996, pp. 473-478, at p. 476.

> essary payments, or that its exchange control regulations restrict the availability of the foreign exchange for that purpose. It is difficult in principle to admit either ground has a justification in international law for non-payment of damages which a state is under an international obligation to pay, particularly in the light of the principle that provisions of national law afford no justification for breach of an international obligation'.[22]

Moreover, as mentioned in chapter 7, Article 19 of the 1996 ILC Draft Articles on State Responsibility was omitted from the 2001 ILC Draft Articles on State Responsibility for wrongful acts. It considers the breach of an environmental obligation to be an international crime where it is 'a serious breach of an international obligation of essential importance for the safeguarding and preservation of the human environment, such as those prohibiting massive pollution of the atmosphere or of the seas'.[23] This Article was excluded because it is considered a sanction which was rejected by the States. Similarly, under Chapter VII of the United Nations Charter sanctions are considered to be related to the action as regards threats, breaches of the peace, and acts of aggression. For the application of the provisions of this Chapter, the UN Compensation Commission, which was established to administrate compensation for environmental damage caused during the Iraqi-Kuwait war, 'excludes sanctions-related losses on the basis that they are not the 'direct' result of the invasion of Kuwait, as required under Resolution 687'.[24] Accordingly, under this Resolution, compensation paid by Iraq as a result of its responsibility for direct environmental damage caused by the invasion of Kuwait is considered a sanction. Moreover, it was suggested to use force in accordance with Article 41 of Chapter VII of the UN Charter to prevent damage to the environment if such damage is a threat to peace and security.[25] It was suggested that force could be used against the State which causes climate change if this is identified, because

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[22] Jennings and Watts (eds.), 1996, at p. 532.

[23] Article 19 (3) (d) of the 1996 ILC Draft Articles on State Responsibility. Peter Malanczuk, "Akehurst's Modern Introduction to International Law", seventh edition, Routledge, London and New York 1997. This edition published in the Taylor & Francis e-Library 2002, at p. 60.

[24] John Barker, "The Different Forms of Reparation: Compensation", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 599-611, at p. 605.

[25] Alexandra Knight, "Global Environmental Threats: Can the Security Council Protect our Earth?" in: New York University Law Review, Vol. 80, No. 5, 2005, pp. 1549-1585, at p. 1549; Christopher K. Penny, "Climate Change and the Security Council: A Preliminary Framework for Implementing Remedial Measures Through Chapter VII of the UN Charter", 2007, pp. 1-17, at p. 14, available at: http://cisdl.org/public/docs/legal/Penny%20-%20Climate%20Change%20and%20the%20Security%20Council.pdf (accessed on 28.2.2012).

climate change is considered a threat to peace and security.[26] However, determining what is an environmental threat to peace has been left to the Security Council, which has been given more flexibility to define environmental threats to peace, regardless of the traditional definition of a threat to peace under the UN Charter.[27] Climate change can be a threat to security because it gives rise to conflicts resulting from environmental problems, such as shortages of food and water.[28]

Finally, the legal consequences of responsibility raise the issue of the conduct of the responsible State in relation to the environmental or nuclear obligation that has been breached. In other words, is the legal consequence of responsibility for an unlawful act the termination or suspension of the obligation that was breached? The answer to this question was addressed in Article 29 of the ILC Draft Articles on State Responsibility, which provides that '[t]he legal consequences of an internationally wrongful act under this Part do not affect the continued duty of the responsible State to perform the obligation breached'. This is important for continuing to carry out a nuclear activity as a hazardous activity, governed by primary obligations which cannot be terminated as long as the activity continues. The primary obligations such as the obligations of prevention must be observed to carry out a nuclear activity. In international law a breach of an international obligation does not mean that the injured State has the right to automatically terminate the obligation concerned. Under the Vienna Convention on the Law of Treaties the injured State has the option to terminate and suspend a treaty.[29] In the Gabčíkovo-Nagymaros Project case, the ICJ decided that the 1977 Treaty between Hungary and Czechoslovakia concerning the construction and operation of the project remained in force, despite continuing material breaches by

[26] Otto Spijkers, "The United Nations, the Evolution of Global Values and International Law", Intersentia, Cambridge/Antwerpen/Portland, 2011, at p. 198.

[27] Christina Voigt, "Security in a 'Worming World': Competences of the UN Security Council for Preventing Dangerous Climate Change", in: Cecilia M. Bailliet (ed.) "Security: A Multidisciplinary Normative Approach", Martinus Nijhoff Publishers, Leiden, the Netherlands, 2009, pp. 291-312, at p. 297; Jo Stigen & Ole Kristian Fauhald, "Environmental Security and the UN Security Council", in: Cecilia M. Bailliet (ed.) "Security: A Multidisciplinary Normative Approach", Martinus Nijhoff Publishers, Leiden, the Netherlands, 2009, pp. 313-342, at p. 342.

[28] Sonia Gupta, "Environmental Law and Policy: Climate Change as a Threat to International Peace and Security", at p. 3, available at: http://www.perspectivesonglobalissues.com/0401/envirolaw.pdf (accessed on 28.2.2012).

[29] Article 60 of the 1969 the Vienna Convention on the Law of Treaties; Commentaries to Article 29 of the 2001 ILC Draft Articles on State Responsibility for Wrongful Acts, at p. 89, para. 3.

the two parties to the treaty.[30] Accordingly, the violation by a State of its environmental and nuclear obligations governing a nuclear activity does not terminate these obligations.

9.3 Cessation and non-repetition of illegal acts: Cessation of illegal nuclear activities and acts

The cessation and guarantees of the non-repetition of illegal acts are the first legal consequence of State responsibility for wrongful acts which violate environmental norms and nuclear obligations under international law. The customary obligation in international law,[31] which is reflected in several instances, indicates that in practice the cessation and guarantees of non-repetition of illegal acts or activities apply. For example, in the Nuclear Tests Cases (Australia v. France),[32] Australia asked the ICJ to declare that it was contrary to international law and its sovereign rights for France to conduct nuclear tests in the South Pacific Ocean, and to request France to put an end to these tests and to refrain from conducting further nuclear tests in the future.[33]

According to the Articles, the State responsible for an internationally wrongful act is obliged to cease that act if it continues to carry out that act, and to offer appropriate assurances and guarantees of non-repetition, if the

[30] The Court stated: 'Hungary maintained that by their conduct both parties had repudiated the Treaty and that a bilateral treaty repudiated by both parties cannot survive. The Court is of the view, however, that although it has found that both Hungary and Czechoslovakia failed to comply with their obligations under the 1977 Treaty, this reciprocal wrongful conduct did not bring the Treaty to an end nor justify its termination. The Court would set a precedent with disturbing implications for treaty relations and the integrity of the rule *pacta sunt servanda* if it were to conclude that a treaty in force between States, which the parties have implemented in considerable measure and at great cost over a period of years, might be unilaterally set aside on grounds of reciprocal non-compliance. It would be otherwise, of course, if the parties decided to terminate the Treaty by mutual consent. But in this case, while Hungary purported to terminate the Treaty, Czechoslovakia consistently resisted this act and declared it to be without legal effect'. Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, ICJ Reports 1997, p. 7, at p. 68, para. 114.

[31] W. Michael Reisman and Myres S. McDougal, "Opinion with Respect to Selected International Legal Problems in LCIA Case No. 7941, May 1, 2009", London Court of International Arbitration (LCIA) United States of America V. Canada (Respondent) No. 81010, at p. 29, available at: http://ita.law.uvic.ca/documents/ReismanExpertOpinion.pdf (accessed on 28.2.2012).

[32] ICJ Reports 1974, p. 253.

[33] See Brownlie, 1983, at p. 202.

circumstances require this.[34] Two conditions must be met in order for an effective cessation of an illegal act. These two conditions were determined by the Tribunal in the *Rainbow Warrior* case. The wrongful act must have a continuing character, and the rule that was violated must be in effect at the time that the order is given.[35] In addition, the ICJ discussed the issue of assurances and guarantees of non-repetition of an internationally wrongful act as the legal consequence of international liability in the *LaGrand* case.[36] The Court granted Germany's request for assurance and non-repetition. It considered that the commitment of the United States to ensure the implementation of specific measures was sufficient to meet Germany's request for a general assurance of non-repetition.[37] In contrast, in the *Pulp Mills* case, Argentina requested the ICJ to decide and declare that Uruguay must provide adequate guarantees to refrain in future from preventing the application of the 1975 Statute of the River Uruguay.[38] This request was dismissed by the Court because it found that there are no special circumstances in this case to warrant orders for assurances and guarantees of non-repetition of such measures.[39]

The function of the cessation of an internationally wrongful act differs from offering the State assurances and guarantees of the non-repetition of the act in the future.

> 'The function of cessation is to put an end to a violation of international law and to safeguard the continuing validity and effectiveness of the underlying primary rule. The responsible State's obligation of cessation thus protects both the interests of the injured State or States and the interests of the international community as a whole in the preservation of, and reliance on, the rule of law'.[40]

However, '[a]ssurances and guarantees are concerned with the restoration of confidence in a continuing relationship, although they involve much more

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[34] Article 30 of the 2001 ILC Draft Articles on State Responsibility.

[35] Rainbow Warrior II (New Zealand v. France), France-New Zealand Arbitration Tribunal, 30 April 1990, International Law Reports (ILR), Vol. 82, pp. 499-590, at p. 573, para. 14.

[36] The issues of assurances and guarantees of non-repetition of the wrongful act were also discussed by the ILC, see, YILC, 1989, Vol. II, Part One, at pp. 42-47.

[37] LaGrand (Germany v. United States of America), Judgment, ICJ Reports 2001, p. 466, at pp. 512-513, para. 124.

[38] Case Concerning Pulp Mills the River Uruguay (Argentina v. Uruguay), ICJ, 20 April 2010 Judgment, at p. 78, para. 277.

[39] Ibid, at p. 78, para. 278.

[40] YILC, 2001, Vol. II, Part Two, at p. 89, para. 5, commentaries to Article 29 of the 2001 ILC Draft Articles on State Responsibility.

flexibility than cessation and are not required in all cases'.[41] Thus the cessation is aimed at the prevention of further breaches of the obligation by the responsible State. However, 'guarantees of non-repetition do not constitute a systematic consequence of the internationally wrongful act; rather they have an exceptional character'.[42] In my view, the cessation of an illegal act puts an end to the violation of a legal act by the State and assures the regulations on a legal activity are in this case so that it can continue operation and does not cause damage to other States and the international community. This legal consequence is a warning given in a court decision to the State which implies that the reactor, for example, may cause environmental damage to other States as a result of violation of the rules, and if this is repeated in the future, the operation of the reactor will be suspended. Wrongful acts of a State are based on the failure to respect the obligations of conventions or other obligations under the general rules of international law for the operation of a nuclear activity.

Nevertheless, the cessation and non-repetition of illegal acts as a legal consequence of State responsibility for wrongful acts are still controversial issues which require careful consideration and clarification. The doctrine of international law is still divided about whether to consider it as an independent legal consequence of State responsibility or as part of reparation. Some writers consider it as a form of reparation,[43] while some writers treat it as a form of restitution[44] and others treat it as a form of satisfaction.[45] Others consider that cessation is a form of restitution, while they consider assurances and guarantees of non-repetition to be a form of satisfaction.[46] However, the ILC considered the cessation and guarantees of the non-repetition of an illegal act as independent legal consequences of State responsibility and not as a form of reparation. This can be deduced from the approach of

[41] YILC, 2001, Vol. II, Part Two, at p. 89, para.9, commentaries to Article 29 of the 2001 ILC Draft Articles on State Responsibility.
[42] Sandrine Barbier, "Assurances and Guarantees of Non-Repetition", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 551-561, at p. 551.
[43] Hoogh, 1996, at p. 146.
[44] John E. Noyes and Brain D. Smith, "State Responsibility and Principle of Joint and Several Liability", in: YJIL, Vol. 13, No. 2, 1988, pp. 225-267, at pp. 240-241; Graefrath, RDC, Vol. 185, Part II, 1984, at p. 84; UN Doc. A/CN.4/344, Second report on the content, forms and degrees of international responsibility (Part 2 of the draft articles), by Willem Riphagan, Special Rapporeur, YILC, 1981, Vol. II, Part One, at p. 86, para. 57.
[45] Carla Ferstman, "Reparation as Prevention: Considering the Law and Practice of Orders for Cessation and Guarantees of Non-Repetition in Torture Cases", pp. 7-27, at pp. 8 and 21, available at: http://projects.essex.ac.uk/ehrr/V6N2/Ferstman.pdf (accessed on 28.2.2012); see also Shelton, AJIL, Vol. 96, at p. 839.
[46] Aust, 2010, at p. 385.

the ILC, which dealt with cessation and non-repetition as a legal consequence of State responsibility for wrongful acts in one article, and reparation in another separate article. This was also endorsed by some writers,[47] who considered cessation and guarantees of the non-repetition of an illegal act to be an independent legal consequence of reparation.

Despite that, the cessation of an illegal act is sometime accompanied by restitution or compensation. In that case, the cessation of the operation of a nuclear reactor is required if it continues to pose a threat to other States. This is a consequence of a breach of the obligation of prevention, which obliges the State to stop the operation of the activity in order to avoid potential environmental damage caused by that activity. However, restitution is required to restore the environment to its previous condition. The State has to pay the costs of reinstatement measures taken to clean up the environment. In the *Trail Smelter* case between Canada and the United States, the Tribunal requested Canada to cease the operation of the Smelter if it continued to cause environmental damage to the US and to provide compensation for the damage and loss caused by the Smelter.[48] Accordingly, cessation as a consequence of liability exists only in the case that an act continues and not in relation to the continued harmful consequences arising out from the act. The continuous effects of unlawful acts are not considered to be a continuous illegal act, as the elimination of the harmful consequences of the activity requires restitution which takes the place of reparation as a legal consequence of international liability.

There is also some confusion about distinguishing between the obligation of prevention as a primary obligation of international liability and cessation as a legal consequence of State responsibility. This raises the question whether the cessation of illegal act should be considered to be one of the forms of reparation, or mere compliance with the original obligation of prevention of harm.[49] This situation leads one to wonder whether cessation as a legal consequence to end the violation of an illegal act is a primary or a secondary obligation.[50] It was argued that, '[t]he breach of an obligation to prevent may be considered a continuing violation or wrongful act. Such a characterization would depend on whether the effect of the breach is ongoing'.[51]

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[47] Stern, 2010, at p. 194; Lefeber, 1996, at p. 129.
[48] RIAA, Vol. III, at p. 1965.
[49] Lefeber, 1996, at p. 129.
[50] Tomuschat, 1989, at p. 152; YILC, 1973, Vol. II, at p. 169, para. 40; YILC, 1975, Vol. II, at p. 55, para. 35; YILC, 1980, Vol. II, Part One, at p. 87, para. 68 and at p. 101; YILC, 1988, Vol. II, Part One, at p. 13, para. 31; YILC, 1993, Vol. II, Part Two, at p. 55, para. 2 of the commentaries on Article 6.
[51] Ferstman, (http://projects.essex.ac.uk/ehrr/V6N2/Ferstman.pdf), at p. 20.

The obligation of prevention varies from the cessation of illegal act to activity causing damage. The obligation of prevention is a primary obligation based on certain procedural obligations and necessary measures to prevent the damage. However, the cessation of an activity is a secondary obligation[52] and a legal consequence of State responsibility for wrongful acts. It is aimed at the respect of the breached primary obligation[53] and the cessation of a continuing illegal act and non-repetition in the future. This shifts the focus of State responsibility from only repairing damage caused by illegal act to ceasing such an act and guaranteeing its non-repetition in the future.[54] Thus the obligation of prevention as a primary obligation incurs State responsibility by itself in the case of its violation, while the obligation of cessation is a secondary obligation for the State to bear the consequences of responsibility, which usually arises after a judgment by the court in the case of a breach of a primary rule in international law. Despite that, primary rules should be taken to guarantee the non-repetition of a wrongful act in the case of cessation. For example, in the case of the cessation of the operation of a nuclear reactor as a result of the violation of rules of nuclear safety, the State must apply the rules in order to resume the operation of the reactor. Nuclear safety rules are primary rules aimed at the prevention of a nuclear accident which must be followed at every stage of the operation of the nuclear installation, even when the reactor has ceased operating. Accordingly, the source State is obliged to cease the operation of a nuclear installation if it has violated of its obligations, or to modify it.

Although it is the duty of the responsible State to bear the costs of the modifications of the activity in order to avoid potentially damage which may be caused if the responsible State is not willing to do so or is unable to perform the required modifications, the international community or the affected States may in some cases bear some of the costs.[55] In practice, there are some cases in which the affected States could share part of the burden of decommissioning and improving the nuclear safety of nuclear States. For instance, after their independence the OECD countries gave the Eastern European countries financial assistance to decommission their nuclear power plants and replace them with new plants, or to modify and improve the nuclear safety standards to meet those of Western countries.[56] As mentioned in chapter 2, in 1995 the Ukrainian authorities announced that they were permanently ceasing

[52] Olivier Corten, "The Obligation of Cessation", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 545-549, at p. 546.
[53] Corten, 2010, at p. 548.
[54] Shelton, AJIL, Vol. 96, 2002, at p. 839.
[55] Lefeber, 1996, at p. 130.
[56] Lefeber, 1996, at p. 131.

the operation of the Chernobyl reactor and were decommissioning it. However, the reactor still poses a threat to the international community. Therefore the G7 committed itself to providing financial assistance through the European Bank for Reconstruction and Development to help Ukraine to complete its programme for decommissioning the reactor, improving standards requirements and replacing the reactor with a new model.[57]

In practice, the principle of cessation has not been applied very widely. Boyle observed that in environmental cases held before international courts and tribunals, the injured States ordered harmful activity to cease, but the tribunals failed to respond and merely ordered some preventive measures to be taken, such as providing information, or ordered the parties to consult and cooperate in providing information.[58] For instance, in the MOX Plant Case, Ireland requested the Tribunal to order the UK to take provisional measures to immediately suspend the authorization of the MOX plant, or to take other measures necessary to prevent the damage caused by the plant during its operation, and to ensure that there would be no movements of any radioactive substances or materials, or wastes associated with the operation of the MOX plant discharged into water under its sovereignty.[59] However, the Tribunal ordered the two parties to cooperate and consult with regard to exchanging information related to the possible consequences for the Irish Sea and to monitor and develop appropriate measures to prevent possible damage to the Irish Sea.[60]

9.4 Reparation of environmental nuclear damage

9.4.1 The concept and nature of reparation and the balance of interests of the impaired environment and the State

Reparation is a general principle of law applied in any national or international legal system.[61] It constituted a general principle of international law even before the appearance of so-called environmental and nuclear law. Reparation has been expressed in legal systems in different ways including

[57] Tromans, 2010, at pp. 35-36; Tromans and FitzGerland, 1997, at p. 33.
[58] Birnie, Boyle and Redgwell, 2009, at p. 227.
[59] International Tribunal for the Law of the Sea, 2001, 3 December 2001, the MOX Plant Case, (Ireland v. United Kingdom), Request for provisional measures, at para. 27 (1) and (2).
[60] Ibid, at para. 89 (1).
[61] Gabriela Echeverria, "Reparation: A Sourcebook for Victims of Torture and Other Violations of Human Rights and International Humanitarian Law", the Redress Trust, London, 2003, at p. 7.

reparation, remedy, indemnity, redress, damages, etc. In addition, the nuclear liability conventions referred to the amount of liability and compensation as legal consequences of liability for nuclear damage. These concepts indicate the legal consequences of liability and responsibility.[62] However, reparation is the term most commonly used by jurists of international law and in international practice. Some writers use it in a broader context to indicate the obligation to make reparation as the normal consequence of liability. It is imposed by law on the actor causing the damage. It has two objectives: (1) to strike a balance between the two interests, i.e., the rights and interests of the injured person, and the interests of the actor after the damage is caused, as regards the reparation for the damage; and (2) to compel the actor to act carefully and not to harm others or repeat its acts.[63] Both objectives are in the interests of protecting the environment, as the State is required to respect the law in order to avoid damage caused to the environment, because it is sometimes difficult to reinstate the environment to the *status quo ante*. The costs of reinstatement measures required to eliminate damage caused to the environment and to clean up the environment damaged by a nuclear accident if this cannot be avoided must also be paid.[64]

The concept and nature of the principle of reparation have been defined under the general rules of international law as reflected in the ILC Draft Articles on State Responsibility, which included a principle of State responsibility for wrongful acts including the principle of reparation.[65] According to the Articles, the responsible State is obliged to make full reparation for the damage caused by the internationally wrongful act of a State, whether material or moral.[66] However, the Court is competent to determine 'the nature or extent of the reparation to be made for the breach of an international obligation'.[67]

The principle of reparation was expressed by the Permanent Court of International Justice in the Case Concerning the Factory at Chorzów (Claim for

[62] Echeverria, 2003, at p. 7.
[63] Brownlie, 1983, at p. 22.
[64] Article 23 of the Institute of International Law Draft Articles on "Responsibility and Liability under International Law for Environmental Damage" adopted in the Session at Strasbourg in 1997 provides that:
'Environmental regimes should provide for the reparation of damage to the environment as such separately from or in addition to the reparation of damage relating to death, personal injury or loss of property or economic value. The specific type of damage envisaged shall depend on the purpose and nature of the regime'.
[65] Birnie, Boyle and Redgwell, 2009, at p. 225.
[66] Article 31 of the 2001 ILC Draft Articles on State Responsibility.
[67] Article 36 (d) of the ICJ Statutes.

Indemnity) (Jurisdiction) (Germany V. Poland) in 1927. This Case was one of the earliest cases to formulate the principle of reparation in international law. In this case, the Court stated that:

> 'It is a principle of international law that the breach of an engagement involves an obligation to make reparation in an adequate form. Reparation therefore is the indispensable complement of a failure to apply a convention and there is no necessity for this to be stated in the convention itself.'[68]

However, the purpose and scope of the principle of reparation had been affirmed by the PCIJ in its judgement in the Chorzów Factory Case in 1928. It its judgment the Court stated that:

> 'The essential principle contained in the actual notion of an illegal act – a principle which seems to be established by international practice and in particular by the decisions of arbitral tribunals – is that reparation must, as far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that act had not been committed'.[69]

These decisions were also confirmed in the Trail Smelter Arbitration between the United States and Canada which was the first case to recognize international liability for environmental damage.[70] The Corfu Channel Case between Britain and Albania in 1949 recognized the duty of a State to prevent activities within its territory which cause damage to other States.[71] Accordingly, the responsible State is obliged to make full reparation for environmental damage caused by a nuclear activity or unlawful environmental interference. Thus reparation is a means to remove damage caused by an illegal act or activity to other parties when responsibility or liability for causing the damage has been proved. It must eliminate all the harmful consequences of the wrongful act or the harmful consequences caused by a nuclear accident. However, it is not possible to eliminate all the consequences of a wrongful act because it is sometimes impossible to go back to the *status quo ante,* e.g., if deaths have occurred, and sometimes it is difficult to determine all the consequences covered by the obligation of reparation.[72]

This is reflected by the nature and forms of reparation. Compensation is the main form of reparation and sometimes it is used in a narrow sense. Ac-

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[68] PCIJ, Ser. A, No. 9, 1927, at p. 21; Brownlie, 2008, at p. 460.
[69] PCIJ, Ser. A, No. 17, 1928, at p. 47; Karl Zemanek, "The Legal Foundations of the International System. General Course of Public International Law", in: RDC, Vol. 266, 1997, pp. 9-336, at p. 268.
[70] Barron, CJTL, Vol. 25, 1987, No. 3, at p. 651.
[71] The Corfu Channel Judgment 1949, ICJ Report of 1949, p. 4 and at p. 22.
[72] Graefrath, RDC, Vol. 185, Part II, 1984, at p. 94.

cording to Brownlie, reparation includes all the measures taken by the responsible State and accepted by the injured State, including compensation, restitution, satisfaction and cessation of a breach of an obligation, while he uses compensation to describe reparation in the narrow sense of payment of money.[73] Accordingly, compensation is the main form of reparation, and the cessation of a breach of an obligation is not an independent legal consequence. Similarly García-Amador stated that, 'according to Anzilotti, a breach or non-performance of an obligation has no other consequence in international law than that of giving rise to a duty to make reparation'.[74] However, according to the Special Rapporteur Barboza, the concept of reparation is broader than compensation because the affected State may prefer another form of reparation. As he stated, 'the concept of reparation was broader than that of compensation. Reparation was intended to include other remedies, in addition to pecuniary damages, that the States concerned might prefer to choose'.[75] Indeed, Barboza made a link between reparation and all activities conducted within the territory of a State or under its jurisdiction or control.[76]

In our opinion, the nature of reparation has evolved as the objectives of liability have evolved. The obligation of a State to make reparation for nuclear damage is based on the fact that the State has a duty under international law to prevent, minimise and repair nuclear damage caused by nuclear activities. Accordingly, it should repair environmental damage caused by such activities where the damage has transboundary implications. Reparation, in the case of a breach of a particular procedural obligation, is aimed at avoiding a possible catastrophe, such as a nuclear accident. Meanwhile the role of reparation in term of compensation entails monetary compensation to remove damage caused by the accident.[77] Reparation in international law is a primary obligation in relation to the liability of the State for environmental damage caused by a nuclear accident which is established if damage is caused, while it is a secondary obligation in relation to State responsibility for its wrongful acts.[78]

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[73] Brownlie, 2008, at p. 459.
[74] Amador, Sohn and Baxter, 1974, at p. 9.
[75] YILC, 1988, Vol. II, Part Two, at p. 21, para. 96.
[76] See, six report of the Special Rapporteur Barboza, YILC, 1990, Vol. II, Part One, at p. 95.
[77] Maria Gavouneli, "Responsibility for Catastrophes: New Concepts in Their Conventional Application", in: David D. Caron and Charles Leben (eds.), "Les aspects internationaux des catastrophes naturelles et industrielles (The International Aspects of Natural and Industrial Catastrophes)", Hague Academy of International Law, Martinus Nijhoff Publishers, The Hague/Boston/London, 2001, pp. 637-675, at p. 645.
[78] See Chapter 5 of this thesis.

9.4.2 Forms of reparation

Forms of reparation as a judicial consequence of international liability are varied, and their application depends on whether they are legal consequences for State responsibility for wrongful acts or State liability for lawful acts. Reparation for State responsibility for wrongful acts may take relatively different forms, i.e., restitution, compensation and satisfaction, while reparation as a consequence of State liability for lawful activities primarily takes the form of monetary compensation.[79] The latter is also the only legal consequence of liability under the nuclear liability conventions. However, all forms of reparation are covered by the general rules of international law. These forms of reparation apply to remedy environmental damage caused by a nuclear accident.[80] The State is obliged to provide full reparation in the case that any form of reparation is applied to repair damage caused by a nuclear accident or damage resulting from a wrongful act or a breach of its international obligations. Unfortunately, the victims of a nuclear accident cannot be guaranteed full compensation under the nuclear liability conventions because the amount of compensation under the Conventions is limited. Consequently, some victims of a nuclear accident might be not compensated or may only be partly compensated.

Forms of reparation have been established on the basis of custom[81] and endorsed by State practice and codified by the ILC Draft Articles on State Responsibility for wrongful acts. However, '[t]he selection of the appropriate form of reparation in a particular case, of course, depends on the facts, i.e., the specific nature of the breach and its consequences'.[82] The priority of application of forms of reparation is given respectively to restitution, compensation, and then satisfaction, where restitution and compensation were impossible.[83] Accordingly, 'there is no inherent difficulty in applying any of

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[79] YILC, 1988, Vol. II, Part Two, at p. 267.

[80] Article 24 of the Institute of International Law Draft Articles on "Responsibility and Liability under International Law for Environmental Damage" adopted in the Session at Strasbourg in 1997 provides that '[e]nvironmental regimes should provide for a broad concept of reparation, including cessation of the activity concerned, restitution, compensation and, if necessary, satisfaction. Compensation under such regimes should include amounts covering both economic loss and the costs of environmental reinstatement and rehabilitation. In this context, equitable assessment and other criteria developed under international conventions and by the decisions of tribunals should also be considered'.

[81] Zemanek, RDC, Vol. 266, 1997, at p. 268.

[82] Smith, 1988, at p. 50.

[83] International Law Commission, Fifty-third session, Geneva, 23 April-1 June and 2 July-10 August 2001 Report of the International Law Commission on the work of its fifty-second session (2000), Topical summary of the discussion held in the Sixth Com-

these concepts to cases of environmental damage: examples of restoration of a damaged environment, compensation for the value of an irreparably damaged environment, or monetary satisfaction for breaches of environmental obligations which cause no quantifiable loss can already be found in state practice or national law'.[84]

9.4.2.1 Restitution and reinstatement of the impaired environment by a nuclear accident

In international law restitution is the primary and essential form of reparation for State responsibility for wrongful acts, and has priority over compensation.[85] This is because the principle is to return the owner's damaged property to its original state (restitution in kind).[86] Restitution is aimed at restoring the situation which existed before the damage was caused, if that it is possible. Therefore there is no justification for the injured State to claim compensation or any other form of reparation if restitution is possible. According to Article 35 of the ILC Draft Articles on State Responsibility, restitution must re-establish the situation that existed before the wrongful act was committed, unless it is materially impossible or involves a burden out of all proportion to the benefit of restitution rather than compensation.[87] Thus as stated by the Tribunal in The Chorzów Factory Case, restitution should 'reestablish the situation which would, in all probability, have existed if that act had not been committed'.[88] However, if the wrongful act caused material

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mittee of the General Assembly during its fifty-fifth session prepared by the Secretariat. UN Doc. A/CN.4/513, at p. 17, para. 71, available at: http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N01/251/22/PDF/N0125122.pdf?OpenElement (accessed on 22.4.20120).

[84] Boyle, 2002, at p. 22.

[85] Hoogh, 1996, at p. 156. For restitution see, Sabine Thomsen, "Restitution", in: R. Bernhardt (ed.), EPIL, Vol. IV, 2000, pp. 229-232; Christine Gray, "The Different Forms of Reparation: Restitution", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 589-597.

[86] Echeverria, 2003, at p. 15.

[87] 'Restitution, in the broad sense of *restitutio in integrum*, represents the obligation to eliminate the effects of the breach, i.e. to restore the situation to its pre-breach state. Restitution 'in kind', the return of persons or property wrongfully taken, constitutes a specific subset of the general *restitutio* obligation. The specific performance of restitution may, of course, in certain cases either be inapplicable or impossible given the nature of the breach and its consequences: *restitutio in integrum* should be discarded when there is absolute impossibility of envisaging specific performance or when an irreversible situation has been created'. Smith, 1988, at pp. 48-49.

[88] The Chorzów Factory Case, (1928), PCIJ, Ser. A, No. 17, 1928, at p. 47.

damage and restitution is materially impossible, then compensation or satisfaction or both can replace it.[89]

Restitution as a form of reparation is an important instrument for the protection of the environment in the case of unlawful environmental interference.[90] The responsible State is obliged to correct the situation resulting from a wrongful act. For example, the State must apply the rules of nuclear safety if it has failed to do so and it must eliminate contamination and clean up the environment if it disposed of nuclear waste at the sea in conflict with the rules of international law. In the case of environmental damage caused by a nuclear accident as a result of a wrongful act, the responsible State must also reinstate the impaired environment to the situation it was in before the accident occurred. This served to prevent nuclear accidents and their harmful consequences.

Furthermore, despite the fact that restitution is a form of reparation for a wrongful act, it can also be considered as a form of reparation for lawful activities. The nuclear liability conventions, which are based on strict liability, use the term reinstatement rather than the term restitution to refer to the restitution of the impaired environment.[91] However, the costs of reinstatement measures of the impaired environment are considered to be compensation. Thus in that context, restitution is a relevant form of reparation for environmental damage where the liability of the State is based on a wrongful act or strict liability.

However, there are some difficulties in applying restitution to remedy environmental damage caused by a nuclear accident, because it is uncertain whether the impaired environment can be restored. As Brownlie stated, 'whilst it is safe to assume that specific restitution as a form of redress has a significant place in the law, it is difficult to state the conditions of its application with any certainty'.[92] In the context of the environment, the application of restitution to repair environmental damage should be clear.[93] Nevertheless, Article 35 of the Articles defines the concept of restitution in a narrow context because it should also be associated with compensation to provide full reparation.[94] In the case of a nuclear accident, contamination

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[89] Case Concerning Pulp Mills the River Uruguay (Argentina v. Uruguay), ICJ, 20 April 2010 Judgment, at p. 77, para. 273; Zemanek, RDC, Vol. 266, 1997, at p. 269.
[90] Lammers, EPL, 31/1, 2001, at p. 45.
[91] Article I (1) (m) of the Amended Vienna Convention; Article I (g) of the 1997 Convention on Supplementary Compensation for Nuclear Damage.
[92] Brownlie, 1983, at p. 222.
[93] Fitzmaurice, 2007, at p. 1018.
[94] YILC, 2001, Vol. II, Part Two, at p. 96, para. 2, commentaries on Article 35; YILC, 1993, Vol. II, Part Two, at p. 62, para. 2, commentary on Article 7.

caused to the environment by the accident must be cleaned up and eliminated in order to restore the environment to its *status quo ante*. Monetary compensation is required to pay for the costs of the reinstatement measures taken. Therefore it is difficult to consider restitution as a separate form of reparation to restore the impaired environment because it is sometimes associated with compensation. In order to restore the impaired environment to its previous condition, the responsible State is obligated to pay the costs of cleaning it up.

However, in this case it is difficult to distinguish between restitution and compensation. In my opinion, this distinction can be made, as restitution is usually carried out by the responsible State, while compensation can be paid by the responsible State to the injured State to repair the damage and to reinstate the impaired environment.

Finally, in some cases environmental damage cannot be remedied.[95] The Chernobyl accident demonstrated that it is impossible to restore the impaired environment to the same condition that pertained before the damage occurred. In the case of a major nuclear accident, radioactivity may damage the fauna and flora. Everything contaminated by a nuclear accident must be eliminated which changes the features of the environment. Therefore it is necessary to make a distinction between restitution in the broader sense, which means a return to the situation before the damage was caused, and restitution in kind. In the first case it is impossible to return the impaired environment to the situation it was in before the nuclear accident, but the environment must be cleaned up to return to the former situation. However, it is possible to return property to its owner by giving similar property. It is not possible for a State to undo a breach of an international obligation, but it is possible for the State to guarantee the non-repetition of such an act. In those cases, compensation or satisfaction is relevant to repair the damage.

9.4.2.2 Compensation for environmental damage caused by a nuclear accident

9.4.2.2.1 Compensation and reparation of damage

Compensation in international law is the main and central remedy for damage resulting from an internationally wrongful act which applies after restitution.[96] According to Article 36 of the 2001 ILC Draft Articles on State Responsibility, the State responsible for an internationally wrongful act is obliged to compensate damage caused by such an act which cannot be reme-

[95] Fitzmaurice, 2007, at p. 1019.
[96] YILC, 1993, Vol. II, Part Two, at p. 76.

died by restitution. The compensation should cover any damage that can be financially assessed, including loss of profits where this has been established. 'Compensation is a prevalent remedy, typically in cash or its equivalent, calculated to make good elements of loss of, or injury to, legally protected interests. It is commonly employed where the loss or injury can be quantified in mone[tar]y terms, but can include recognized non-pecuniary injuries…'[97]

According to the principle as determined by the PCIJ in its judgement in the Chorzów Factory Case in 1928, compensation should remedy all the damage caused by illegal act to return to the situation before the act was committed.[98] In order to provide full reparation, compensation should cover direct and non-direct damage. As we saw in chapter 3, in the Case concerning the United States Products Company (United States v. Germany), the Tribunal rejected the distinction between direct and indirect damage because there was no clear standard to determine the compensable damage.[99] This also applies to compensation for damage caused by lawful activities. Similarly, the nuclear liability conventions do not distinguish between direct and indirect damage caused to the victims of a nuclear accident. They consider that all nuclear and non-nuclear damage caused by a nuclear accident is nuclear damage. Therefore the recoverable environmental damage must be caused by an activity. The injured State or the victims must prove that the damage was caused by a wrongful act or by a nuclear accident (causality between the damage and the nuclear activity).[100]

Thus the compensation should cover all the damage suffered by the injured State or the victims. This is governed by the general rules of international law and the nuclear liability conventions. Under the general rules of international law compensation is used to remedy damage resulting either from physical damage caused to the environment by a nuclear accident or from moral or legal damage resulting from a breach of environmental and nuclear obligations. However, under the nuclear liability conventions, compensation is aimed at remedying physical damage caused by a nuclear accident, including damage or loss to property and persons, economic loss and damage to the impaired environment, and the costs of measures of preventive and restoring it to its previous condition. It should also cover psychological and moral damage caused to victims of a nuclear accident, but it does not cover legal damage caused as a result of the violation by a State of its

[97] Barker, 2010, at p. 599.
[98] The Chorzów Factory Case, PCIJ, 1928, Ser. A, No. 17, at p. 47.
[99] RIAA, Vol. VII, at p. 62-63.
[100] See chapter 3 of the thesis.

international obligations. This is governed by the general rules of international law.

In most cases, compensation is covered by international conventions and awards made by international tribunals and courts. Under the nuclear liability conventions, compensation for environmental damage caused by a nuclear accident is provided by the operator of a nuclear installation under the applicable nuclear liability convention, i.e., the Paris convention, the Vienna Convention and the Brussels Convention on the Liability of Operators of Nuclear Ships.[101] The State is also obliged to provide additional compensation to victims of nuclear damage under the Brussels Supplementary Compensation and the Vienna Convention as Amended by the 1997 Protocol and the 1997 Supplementary Compensation Convention.[102] As mentioned above, compensation for nuclear damage under these conventions is claimed under the civil liability regime. However, the remaining compensation and uncompensated damage, including damage caused as a result of a wrongful act, should be claimed under the general rules of international law.[103] Furthermore, the victims should not be awarded compensation twice. Victims of a nuclear accident who seek compensation under the civil liability regime of the nuclear liability conventions are not entitled to compensation under the general rules of international law, unless they have not been fully compensated.

The principle of compensation for environmental damage is fully supported by the 1972 Convention on International Liability for Damage Caused by Space Objects under the general rules of international law. According to that Convention, compensation should be determined by the principles of international law, including the principles of justice and equity.[104] In the Case Concerning the Gabčíkovo-Nagymaros Project the ICJ supported compensation for environmental damage by stating that both Slovakia and Hungary were entitled to compensation under international law because both had suffered damage and each State should pay compensation to the other State, according to the 1977 Treaty.[105] In the case of Hungary, the Court stated that 'Hungary is entitled to compensation for the damage sustained as a result of the diversion of the Danube, since Czechoslovakia, by putting into operation Variant C, and

[101] See chapter 8 of the thesis.
[102] See Lammers, HYIL, Vol. 16, 2003, pp. 47-79.
[103] See chapter 6 of the thesis.
[104] Article XII of the 1972 Convention on International Liability for Damage Caused by Space Objects.
[105] ICJ Reports 1997, p. 7, at p. 81, para. 152; see also, Fisheries Jurisdiction (Federal Republic of Germany v. Iceland), Merits, Judgment, ICJ Reports 1974, p. 175, at pp. 203-205, paras. 71-76.

Slovakia, in maintaining it in service, deprived Hungary of its rightful part in the shared water resources, and exploited those resources essentially for their own benefit'.[106]

9.4.2.2.2 Assessment of compensation for environmental damage

The assessment of compensation for environmental damage caused by a nuclear accident or in the case of State responsibility for a violation of environmental and nuclear obligations depends on the applicable regime of liability. Under the nuclear liability conventions, compensation is estimated for each nuclear accident according to the amount of liability determined under the applicable convention. However, under the general rules of international law there are no specific rules for the assessment of compensation. It is assessed by the competent court according to the facts presented, unless there is an agreement by the parties concerned which determines the amount of compensation in this case. Therefore, the amount of compensation is subject to negotiations between the States parties and the assessments of judges. Accordingly, the amount of compensation is limited by the provision of the applicable liability conventions, while under the rules of international law it is unlimited and the court estimates the compensation required for all the damage caused by a nuclear accident.

9.4.2.2.2.1 Assessment of compensation under the nuclear liability conventions

The assessment of the amount of compensation to be paid for the reparation of environmental damage caused by a nuclear accident under the nuclear liability conventions varies from one convention to another. The Conventions limit the amount of compensation and the time for victims to bring actions for compensation to the competent court. However, the nature and extent of compensation under the nuclear liability conventions have been left to be determined by the competent court. This section discusses three issues related to the assessment of compensation under the nuclear liability conventions. These are the amount of compensation, the time limit for bringing claims for compensation and the competent court. These issues will be discussed in relation to every nuclear liability convention with reference to some of the bilateral nuclear liability agreements governing nuclear activities.

The amount of compensation

Under the 1960 Paris Convention compensation for nuclear damage caused by a nuclear accident consists of two tiers of compensation.[107] The Conven-

[106] ICJ Reports 1997, p. 7, at p. 81, para. 152.

tion limits the maximum amount of the operator's liability to a maximum of 15 million European Monetary Agreement units of account (SDRs) per nuclear accident and not less than 5 million SDRs.[108] This should be covered by insurance or other financial security up to the maximum amount of liability set by national legislation, in pursuance of the amount provided by the Paris Convention.[109] This maximum amount of compensation, however, was little more than the amount of nuclear damage caused by a nuclear accident, compared with the amount of compensation provided for under the national legislations of some Contracting Parties, which limit the operator's liability to an amount higher than 15 million SDRs as imposed by the Convention, or set a lower ceiling.[110] This amount of compensation could not meet the objectives of the Convention, which is mainly aimed at guaranteeing equitable compensation to victims of nuclear damage. In comparison with some national laws at that time, the Convention's maximum compensation did not appear to be equitable at all. Furthermore, in order to guarantee equitable compensation to victims of a nuclear accident, the Convention prevents discrimination between the victims on the basis of nationality, domicile or residence.[111]

To ensure appropriate compensation for all victims who suffer nuclear damage as a result of a nuclear accident, the Paris Convention was supplemented, as mentioned above, by the 1963 Brussels Supplementary Convention to provide compensation additional to that of the operator's liability under the Paris Convention, which is provided by the Installation State and other Contracting Parties. This additional compensation under the Brussels Convention, as amended by the 1982 Protocol, is up to 300 million SDRs.[112] The amount of compensation under the 1963 Brussels Convention consists of three tiers. The first tier is provided by the operator of a nuclear installation under the Paris Convention and should be a minimum of 5 million SDRs

[107] For references, see Patrick Reyners, "Compensation for Nuclear Damage in the OECD Member Countries", in: OECD/NEA, Compensation for Pollution Damage, OECD, Paris 1981, pp. 93-123.

[108] Article 7 (b) of the 1960 Paris Convention.

[109] Article 10 of the 1960 Paris Convention.

[110] Some States at that time adopted the minimum amount limited by their laws, which exceeded the limited amount of the Convention. French law limited the minimum amount of the liability to 50 million per accident. Germany law limited the liability of the operator to DM18 million and additional compensation by the State to DM500 million. The United Kingdom set the operator's liability at £5 million and £18 million for each nuclear accident, and the United States law limited the amount to $560 million per accident.

[111] Article 14 of the Paris Convention.

[112] Article 3 (a) of the 1963 Brussels Supplementary Convention.

and a maximum of 15 million SDRs, covered by insurance or other financial security. This is the amount of the operator's liability under the Paris Convention. The second tier is provided by public funds under the 1963 Brussels Supplementary Convention. It is provided by the Contracting State in whose territory the nuclear reactor is located when the amount of compensation required for victims of a nuclear accident exceeds the first tier, the operator's liability, up to 175 million SDRs. The third tier is also provided by public funds to be paid by all the Contacting Parties to the Convention between the second tier and 300 million SDRs (125 million SDRs) if the required amount of compensation exceeds the second tier. It is calculated according to the formula established in Article 12 of the Convention.[113] This formula is based on 50% of the gross national product of the Contracting Party and 50 % of the thermal power of the installed nuclear reactors' capacity in its territory.[114] This amount of compensation under the two Conventions was further increased by the 2004 Protocols to Amend to the two Conventions in order to be consistent with the required amount of compensation for a nuclear accident, because it was too low to cover all the nuclear damage caused by a nuclear accident.

The amount of the operator's liability, as amended by the 2004 Protocol to Amend to the Paris Convention, raised the amount of the operator's liability from 15 million SDRs for the maximum amount to not less than €700 million[115] and for low-risk installations and transport of nuclear substances to €70 million and €80 million respectively per nuclear accident, the minimum amount of the operator's liability.[116] The Protocol also allows the States which joined the Convention after 1 January 1999 to limit the operator's liability in its national legislation to not less than €350 million for five years from the date of the adoption of the 2004 Protocol.[117] The unit of account also was changed from SDR to euro. Finally, in case that the Amended Paris Convention is applicable to a non-Contracting Party whose nuclear liability legislation provides for reciprocal benefits like the Convention, the Protocol allows a Contracting Party to establish a lower liability scheme than that provided for under the Convention in respect of nuclear damage suffered by a non-Contracting Party to the extent that it provides reciprocal benefits

[113] Article 3 (b) of the 1963 Brussels Supplementary Convention.
[114] Article 12 of the 1963 Brussels Supplementary Convention.
[115] Article 7 (a) of the 2004 Amended Paris Convention.
[116] Article 7 (b) of the 2004 Amended Paris Convention.
[117] Article 21 of the 2004 Amended Paris Convention; Michel Montjoie, "Nuclear Energy", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 915-928, at p. 924; Nocera, 2005, at p. 414.

of an equivalent amount.[118] This aims at motivation of non-Contracting States to join the Convention.

In addition, the 2004 Brussels Amended Supplementary Convention increased the amount of compensation and changed the unit of account from SDR into euro in order to be consistent with the Amended Paris Convention. This Convention increased the amount of compensation up to €1500 million per nuclear accident. This must be guaranteed by the Contracting Parties. The Convention is also composed of three tiers, the same division as that in the original Brussels Supplementary Convention, but the amount of compensation has increased. Under the Paris Convention the first tier is provided by the operator of a nuclear installation up to at least €700 million, which should be insured by his financial cover. This amount of compensation must also be guaranteed by the Installation State. In the case that it is not available or is insufficient to cover all the nuclear damage caused by a nuclear accident, it must be provided by the Installation State in whose territory the installation of the liable operator is located, up to the amount of the operator's liability.[119] The second tier is provided by public funds provided by the Installation State between the first tier and €1200 million, i.e., €500 million where the first tier, paid by the operator (€700 million), was insufficient to compensate all the nuclear damage caused by the nuclear accident. However, the third tier is paid by all the Contracting Parties between the second tier (€1200 million) and €1500 million, i.e., €300 million. It is calculated for each Contracting Party according to the formula established in Article 12 of the Convention.[120] This formula is different from that provided for under the 1963 Brussels Supplementary Convention because it is based on the calculation of the nuclear energy that is generated and the gross domestic product of the acceding party. It is based on 35% of the gross domestic product and on 65 % of the installed nuclear capacity.[121] This method of calculation applies the principle of justice because the nuclear States which are the beneficiaries of nuclear energy have to pay the highest contributions. On the other hand, it makes more compensation available to victims of nuclear damage, depending on the number of nuclear contracting parties.

Similarly, the 1963 Vienna Convention limits the minimum amount of liability of the operator of a nuclear installation to not less than US$5 million per nuclear accident, excluding any interest or costs of claims for compensation awarded by the courts, with no maximum limit. This amount was esti-

[118] Articles 2 (a) (iv) and 7 (g) of the 2004 Amended Paris Convention.
[119] Rustand, 2003, at p. 140.
[120] Article 3 of the 2004 Amended Brussels Supplementary Convention.
[121] Articles 12 of the 2004 Amended Brussels Supplementary Convention.

mated according to the 1963 value of gold, equivalent to the value of the US dollar in terms of gold on 29 April 1963, which was US$35 per troy ounce.[122] This price does not reflect the development of the gold price, which is increasing and cannot be compared to the gold price in 1963.[123] This Convention does not have a supplementary convention to provide additional compensation to victims of a nuclear accident, as in the case of the Paris Convention which was supplemented by the 1963 Brussels Supplementary Compensation Convention. Therefore increasing the amount of compensation provided under the Convention was one of the main purposes of the revision of the Vienna Convention.[124] This was taken into account by the negotiators during the revision of the Convention in the Standing Committee.[125]

After its amendment by the 1997 Vienna Protocol, the Convention established the amount of compensation to either not less than the minimum amount of compensation (300 million SDRs)[126] or not less than 150 million SDRs, provided that the difference between this amount and the higher amount (300 million SDRs) must be made available by the Installation State by public funds.[127] It also allowed the Installation State to determine a transitional period of 15 years from the date of entry into force of the Protocol to compensate nuclear damage caused by a nuclear accident during that period, and to determine the amount of compensation at less than 100 million SDRs.[128] However, the difference between the lesser amount and 100 million SDRs must be available by the State by public funds. In any case, the limited amount of liability must not be less than 5 million SDRs and the difference between this amount and the higher amount, 300 million SDRs, must be secured by the Installation State by public funds.[129] Nevertheless, the amount

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[122] Article V of the 1963 Vienna Convention.

[123] Steven G. Kaplan, "Compensating Damage Arising from Global Nuclear Accidents: The Chernobyl Situation", in: LLAICLJ, Vol. 10, 1988, pp. 241-269, at p. 250.

[124] Layard, RECIEL, Vol. 5, Issue 3, 1996, at p. 219; Frantisek Suransky, "Increased Liability Amounts under the 1997 Vienna Protocol and Elsewhere", in: OECD/NEA and IAEA, 2000, pp. 115-123.

[125] It was suggested during the negotiation that the amount of liability must be limited to not less than 150 million SDRs. This amount is based on a recommendation by the Steering Committee of the OECD Nuclear Energy Agency. G. C. Warren, "Vienna Convention Revision: A Review of the Exercise and the Insurance Implications in the Provisions under Discussion", in: NLB, No. 55, 1995, pp. 9-17, at p. 14.

[126] Article V of the 1997 Amended Vienna Convention; Article 7 (1) (1) (a) of the 1997 Vienna Protocol.

[127] Article 7 (1) (1) (b) of the 1997 Vienna Protocol.

[128] Article 7 (1) (1) (c) of the 1997 Vienna Protocol.

[129] Article 7 (1) (2) of the 1997 Vienna Protocol.

of compensation provided by the Vienna Convention is still small to cover all the damage caused by a nuclear accident compared with the Paris Convention and its Brussels Supplementary Convention. This indicates why the 1997 Vienna Convention on Supplementary Compensation was adopted. However, this Convention does not apply only to damage caused by a nuclear accident to victims of the Contracting Parties to the Vienna Convention, but also to victims of the Paris Convention.

Therefore, both the Vienna and the Paris Conventions benefited from the 1997 Convention on Supplementary Compensation for Nuclear Damage.[130] This Convention is a freestanding convention which applies to the Contracting Parties of both the Paris and Vienna Conventions. The amount of compensation under this convention is composed of two tiers. The first tier has to be paid by the Installation State, while the second tier is paid by all the Contracting Parties to the Convention. The minimum amount of compensation under this Convention is 300 million SDRs. This amount will be paid by the Installation State.[131] The Convention also allows a Contracting Party to establish a transitional amount of at least 150 million SDRs to compensate for nuclear damage caused by a nuclear accident for the maximum period of ten years from the date of the opening of the Convention to its signature.[132] This amount of compensation is paid by the Installation State under the civil liability regime when the amount of compensation exceeds the amount of liability of the operator of a nuclear installation and the limited amount of compensation for a nuclear accident under the applicable convention. However, the collective contributions of the Contracting Parties must be paid by the Contracting States according to a formula established under Article IV of the Convention. According to this formula, the amount of the State's contributions is calculated on the basis of the installed nuclear power capacity of the Contracting State per MW thermal power and the UN Rate of Assessment for that State. However, a State with a minimum rate of assessment which does not generate nuclear power is not required to make contributions.[133] Thus the available amount of contributions for a nuclear accident depends on the number of nuclear Contracting Parties to the Convention. This amount of compensation is paid by the Contracting Parties where the amount of compensation of the first tier was insufficient to compensate all the nuclear damage caused by a nuclear accident. Moreover, the Convention allows a Contracting State to arrange public funds outside the scope of the

[130] For references, see McRae, 2000, pp. 171-183; McRae, NLB, No. 61, 1998, pp. 25-38; Melchior, 1993, pp. 447-463.
[131] Articles III (1) (a) (i) of the 1997 Supplementary Compensation Convention.
[132] Articles III (1) (a) (ii) of the 1997 Supplementary Compensation Convention.
[133] Articles III (1) and IV of the 1997 Supplementary Compensation Convention.

Convention through regional or other agreements to fulfil its obligations under the Convention. This is provided that such agreements do not impose additional obligations on the Contracting Parties, or the member States have no nuclear installations in their territories, for instance, according to the principle of reciprocity.[134] However, beyond this amount, compensation for a nuclear accident must be claimed by the State under international law.[135]

The amount of compensation to be paid to victims of a nuclear accident on a nuclear ship under the 1962 Brussels Convention on Liability of the Operators of Nuclear Ships[136] is limited to 1,500 million gold francs per nuclear accident, excluding the interests and costs of actions for compensation.[137] This Convention does not provide for additional compensation to be paid by the Installation State, but it obliges the operator to provide financial coverage. The licensing State must also ensure the payment of claims against the operator for compensation to victims of nuclear damage by providing the necessary funds up to the limit of the above-mentioned amount of compensation.[138]

Furthermore, a similar amount of compensation is provided by all the bilateral nuclear agreements relating to liability for nuclear damage caused by nuclear ships. Under the bilateral agreements between the United States and the host States, liability is limited to $500 million per nuclear accident with regard to the Nuclear Ship *Savannah* in the ports of those States.[139]

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[134] Article XII (2) of the 1997 Supplementary Compensation Convention.

[135] Birnie, Boyle and Redgwell, 2009, at p. 528.

[136] Szasz, JMLC, Vol. 2, 1970-71, pp. 541-569, at pp. 555-556.

[137] Article III (1) of the 1962 Brussels Nuclear Ships Convention.

[138] Article III (2) of the 1962 Brussels Nuclear Ships Convention.

[139] Article 4 of Agreement between the Government of the Kingdom of the Netherlands and the Government of the United States of America on Public Liability for Damage Caused by the *N.S. Savannah*, signed in The Hague on 6 February 1963, provides that: 'It is agreed that the aggregate liability of the United States arising out of a single nuclear incident involving the *N.S. Savannah*, regardless of where damage may be suffered, shall not exceed $500 million'. See UNTS, Vol. 487, 1964, p. 113; the 23 November 1964 agreement between the United States and Italy on the use of the Italian ports by the *N. S. Savannah* limits the amount of liability for nuclear damage caused by the *N.S. Savannah* according to the American Public Law 85-256 (Annex A) as amended by 85-602 (Annex B), Article VIII, UNTS, Vol. 532, 1965, p. 133; see also, para. I, Exchange of Notes Concerning An Agreement between the United States of America and Italy Concerning Liability During Private Operation of *N.S. Savannah*, Rome, 16 December 1965, UNTS, Vol. 574, 1966, p. 139. The amount of liability under this agreement is limited to $500 million. UNTS, Vol. 532, 1965, p. 133; see also, para. I, Exchange of Notes Concerning an Agreement between the United States of America and Italy Concerning Liability During Private Operation of *N.S. Savannah*, Rome, 16 December 1965, UNTS, Vol. 574, 1966, p. 139; see para. I (2) (2) of Exchange of Notes Concerning an Agreement between

However, under the agreements between Germany and other countries concerning the German *N. S. Otto Hahn* in the ports of those countries liability is limited to DM400 million per nuclear accident.[140] The amount of liability under the bilateral agreements is ensured by the States involved.[141]

Despite the fact that the amount of compensation provided by the operator and the States to victims of a nuclear accident was increased after the amendments of the Paris and Vienna Conventions and the adoption of the 1997 Convention on supplementary funding and the amendment of the Brussels Supplementary Convention, it is still insufficient to cover damage caused by a major accident. For instance, the Chernobyl accident cost $3 billion, which is over the limit of any nuclear liability convention.[142] Similarly, with regard to the Fukushima nuclear accident, the Government of Japan agreed to provide financial assistance of JPY 5 trillion ($62 billion) to the operator of the nuclear installation so that compensation could be paid to victims of the accident.[143] The initial assessment of compensation for the damage caused by the accident was estimated to be approximately $235 billion.[144] Furthermore, after the amendments of some nuclear liability legislations, the amount of compensation for a nuclear accident was set higher than the amount of compensation provided by the nuclear liability conventions. For instance, under the US Price Anderson Act the operator's liability is now

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the United States of America and Ireland Relating to Public Liability for Damage Caused by the *N.S. Savannah*, Dublin, 18 June 1964, UNTS, Vol. 530, 1965, p. 217.

[140] Article 13 of Treaty between the Republic of Liberia and the Federal Republic of Germany on the Use of Liberian waters and Ports by N. S. Otto Hahn, Bonn on 27 May 1970, Bundesgesetzblatt, Teil II, 21 July 1971, No. 34, pp. 953-959; Article 6 (3) of the Treaty between the Federal Republic of Germany and the Federative Republic of Brazil Concerning the Entry of Nuclear Ships Into Brazilian Waters and Their Stay in Brazilian Ports, UNTS, Vol. 966, 1975, p. 183, provides that, '[t]he liability of the operator shall be limited to 400 (four hundred) million German marks (Deutsch Marks) in respect to nuclear accident'.

[141] Article 16 of the 27 May 1970 Treaty between Liberia and Germany regarding the use of Liberian waters and ports by the *N. S. Otto Hahn* provides for ensuring the amount of liability for damage caused by the *Otto Hahn* by the government of Germany. Similar provisions are provided by the 18 June 1964 agreement between the United States and Ireland, concerning liability for damage caused by the Savannah. Paragraph 5 of this agreement, states that '[t]he Government of the United States shall ensure that prompt payment is made in respect of the liability referred to in paragraph (1) of this agreement'.

[142] Okowa, 2000, at p. 227.

[143] World Nuclear Association, "Liability for Nuclear Damage", available at: http://www.world-nu clear.org/info/inf67.html (accessed on 22.2.2012).

[144] Thom Brooks, "After Fukushima Daiichi: New Global Institutions for Improved Nuclear Power Policy", at p. 2, available at: http://ssrn.com/abstract=1973494 (accessed on 24.2.2012).

determined at $12.5 billion per nuclear accident, Germany provides unlimited liability of €2.5 billion per plant and Japan provides JPY 120 billion (US$ 1.4 billion).[145] This indicates that the amount of compensation provided for under a nuclear liability convention will not cover all environmental damage caused by a major nuclear accident if the amount of compensation provided is limited. Therefore, the option is to compensate the remaining environmental damage caused by a major nuclear accident under the general rules of international law. The adoption of State intervention under the nuclear liability conventions is considered a great step forward in improving the system of State liability to cover the nuclear damage caused by accidents in nuclear reactor. This can lead to the recognition of the international liability of State for nuclear damage caused by accidents in nuclear reactors, especially for transboundary environmental damage.

The time limit for presenting claims for compensation

The 1960 Paris Convention limits the time for presenting claims for compensation for nuclear damage against the operator of a nuclear installation to ten years from the date of the occurrence of a nuclear accident.[146] This period of time was not enough to reveal all the damage caused by a nuclear accident, especially personal injuries which take decades to be discovered. At the same time, some national laws provide for longer periods of time for bringing claims for compensation.[147] The 2004 Paris Protocol adopted a longer period, which allows the victims of a nuclear accident to bring claims for compensation for loss of life and personal injury for up to thirty years from the date of a nuclear accident and for other nuclear damage, including environmental damage for up to ten years from the date of a nuclear accident.[148] However, claims for compensation are no longer valid if they are not brought within three years from the date after which the victims know or should reasonably know about the damage and the operator liable for the damage.[149]

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[145] World Nuclear Association, (accessed on 22.2.2011). The liability of the operator of a nuclear installation according to German nuclear law is not limited. However, it is limited by the amount of compensation provided for under section 34 of Atomic Energy Act which amount €2.5 billion according to the amendments of 29 August 2008 to the Act. Furthermore, this Act allows compensation for damage suffered in other countries, but according to the principle of reciprocity. See NEA, Nuclear Legislation in OECD Countries, 2003.

[146] Article 8 (a) of the Paris Convention.

[147] Germany, the UK and Switzerland extended the period for demanding compensation to thirty years.

[148] Article 8 (a) of the 2004 Amended Paris Convention.

[149] Article 8 (d) of the 2004 Paris Protocol.

Similarly, the 1963 Vienna Convention limits the time for the submission of claims for compensation for nuclear damage caused by a nuclear accident to ten years from the date of the accident. It also allows for the extension of the ten years under the law of the Installation State, provided that the period which exceeds ten years is covered by the operator by insurance or other financial security, or by State public funds.[150] Nevertheless, as in the case of the Paris Convention, it was clear that this period of time was insufficient for all the nuclear damage caused by a nuclear accident to be revealed, as most conditions caused as a result of exposure to nuclear radiation take a few decades to develop. This was taken into account during the negotiations for the revision of the Vienna Convention and was reflected in the new amendments to the convention, which included a longer period of time for the submission of claims for compensation than that provided by the 1963 Vienna Convention.[151] The 1997 Protocol Amending the Vienna Convention therefore replaced the original ten years by a period of thirty years as regards loss of life and personal injuries, and ten years for other injuries, including environmental damage.[152] Accordingly, claims for compensation are no longer valid if they are not submitted to court within thirty years from the date of the nuclear accident as regards loss of life and personal injury, and within ten years of the date of the nuclear accident as regards other injuries.[153] The Protocol also gives the Installation State the right to determine a longer period than that provided for by the Protocol in its national law, provided that this is covered by the operator's liability as regards financial coverage for any claim for compensation brought after the period indicated in the Convention.[154] Furthermore, it should not affect any person's right to compensation for nuclear damage who has brought an action for compensation against the operator within the thirty or ten years provided for by the Convention.[155] Actions for compensation become invalid if they are not brought within three years from the date on which the victims of nuclear damage know or should reasonably know about the damage and the nuclear operator liable for the damage.[156]

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[150] Article VI (1) of the Vienna Convention.
[151] Report of the Standing Committee on Liability for Nuclear Damage, Eleventh Session, SCNL/11/INF.5, at p. 22.
[152] Article 8 (1) (a) of the 1997 Vienna Protocol.
[153] SCNL/11/INF.5, at p. 22.
[154] Article 8 (1) (b) of the 1997 Vienna Protocol.
[155] Article 8 (1) (c) of the 1997 Vienna Protocol.
[156] Article 8 (3) of the 1997 Vienna Protocol; Report of the Standing Committee on Liability for Nuclear Damage, Eleventh Session, SCNL/11/INF.5, at p. 23.

The 1962 Brussels Nuclear Ships Convention limits the time for bringing claims for compensation to ten years from the date of the accident, unless the law of the State which licensed the operator provides for a period longer than ten years, provided that there is financial coverage.[157] Similarly, the bilateral nuclear liability agreements, such as the agreement of 27 May 1970 between Germany and Liberia[158] and Article 6 (6) and (7) of the agreement of 7 June between Germany and Brazil[159] on the Use of Liberian and Brazilian Ports by the N. S. Otto Hahn, limit the time of liability for the submission of claims to the courts to a period of ten years.

Despite the fact that the Amended Paris and Vienna Conventions provide for bringing claims for compensation within thirty years in case of loss of life and personal injuries and to ten years for other damage, neither of these periods is sufficient for the damage to be fully revealed. In the case of the Chernobyl accident, there are some restrictions on the proper use of the environment in some places as they are still contaminated, and they cannot be used by the public, despite the fact that the accident occurred more than twenty-five years ago. This contamination may expose people to radioactivity, and any person exposed to radioactivity may suffer injury in the future. It is difficult for any victim who suffers injury as a result of radioactive contamination to be compensated in accordance with the nuclear liability conventions. Therefore, victims of a nuclear accident should bring their claims for compensation within ten years of discovering the damage and the operator liable for the damage, and not within ten years of the occurrence of the accident.

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[157] Article V (1) of the 1962 Brussels Nuclear Ships Convention.

[158] Article 14 of this agreement provided that '(1) Rights of compensation under Article 13 of this Treaty shall be extinguished if an action in not brought within ten years from the date of the nuclear accident. (2) Where nuclear damage is caused by nuclear fuel, radioactive products or waste which were stolen, lost, jettisoned, or abandoned, the period established in para. 1 shall also be computed from the date of nuclear incident causing the nuclear damage, but the period shall in no case exceed a period of twenty years from the date of the theft, loss, jettison or abandonment. (3) If the period established in para. (1) and the period established in para. (2) have not been exceeded the rights of compensation under Article 13 of this Treaty shall be subject to a prescription period of three years from the date on which the person who claims to have suffered a nuclear damage had knowledge or ought reasonably to have had knowledge of the damage and of the person liable for the damage'.

[159] Treaty between the Federal Republic of Germany and the Federative Republic of Brazil Concerning the Entry of Nuclear Ships Into Brazilian Waters and Their Stay in Brazilian Ports, UNTS, Vol. 966, 1975, p. 183.

The competent court for compensation

Determining the competent court to decide on compensation for nuclear damage is an important issue because the nuclear installation may be located in one country while the liable persons may be in another country, and the nuclear accident may have occurred in yet another country, e.g., in the case of the transport of nuclear substances where the harmful consequences become apparent in another country. This raises the question of which courts in which countries are competent as regards claims of compensation for environmental damage. In principle, under the Paris and Vienna Conventions, the jurisdiction of the competent court over claims for compensation lies with the courts of a Contracting Party in whose territory the nuclear accident has occurred.[160] However, if the accident occurred outside the territory of a Contracting Party or the location of the accident cannot be determined, the jurisdiction of the courts lies with the courts of the Installation State.[161] Furthermore, if a nuclear accident has occurs in the exclusive economic zone of a Contracting Party or such a zone has not been established, where it is an area not exceeding the limit of the exclusive zone, the jurisdiction of the court over claims of compensation for nuclear damage lies with the courts of that Contracting Party.[162] Judgments pronounced by the competent court are recognized and enforceable in the territory of any other Contracting Party to the Convention without any further proceedings.[163] Except as regards measures of execution, the Contracting State may not invoke any jurisdictional immunity before the competent court.[164]

Similarly, the exclusive jurisdiction of the competent court over claims of compensation for environmental damage caused by a nuclear accident under the 1997 Convention on Supplementary Compensation lies with the courts of the Contracting Parties within whose territory the nuclear accident occurred.[165] However, the competent courts which have jurisdiction over claims for compensation for nuclear damage caused by nuclear accidents in

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[160] Article 13 (a) of the Paris Convention; Article 13 (a) of the 2004 Amended Paris Convention; Article XI (1) of the Vienna Convention; Magnus, 2010, at pp. 110-113; Andrea Gioia, "Maritime Zones and the New Provisions on Jurisdiction in the 1997 Vienna Protocol and in the 1997 Convention on Supplementary Compensation", in: NLB, No. 63, 1999, pp. 25-38, reproduced in: OECD/NEA and IAEA, 2000, pp. 299-322.

[161] Article 13 (b) of the Paris Convention; Article XI (1) of the Vienna Convention.

[162] Article 12 (1) of the 1997 Vienna Protocol; Philippe Sands and Paolo Galizzi, "The 1968 Brussels Convention and Liability for Nuclear Damage", in: OECD/NEA and IAEA, 2000, pp. 475-506, at p. 487.

[163] Article 13 (i) of the 2004 Amended Paris Convention.

[164] Article 13 (j) of the 2004 Amended Paris Convention.

[165] Article XIII (1) of the 1997 Supplementary Compensation Convention.

the territorial sea or the exclusive economic zones are those of the State which has jurisdiction over those areas.[166] Therefore all the Contracting Parties have to recognize the competence of that court and the fact that only one court is competent for nuclear damage caused by a nuclear accident. Finally, judgments of the competent courts are recognized and enforceable by other contracting parties.[167]

The situation is rather different from what is provided for under the maritime nuclear liability conventions, which give more options to victims of a nuclear accident to claim for compensation. Accordingly, the jurisdiction with regard to claims for compensation under the 1962 Brussels Nuclear Ships Convention lies with the courts of the licensing State, or the courts of the Contracting State or the courts of the Contracting Party in whose territory the damage was suffered.[168] This is in the interests of victims of a nuclear accident, because it gives them more options and facilitates the procedures for bringing their claims for compensation, but it affects the outcome of the compensation, as the amount of compensation will differ from one victim to another, depending on the court where the claim is presented.

Furthermore, despite the fact that this Convention was taken as a model for the bilateral nuclear liability agreements for nuclear damage caused by nuclear ships, jurisdiction under these agreements lies only with the courts of the host States.[169] The law of the host State is also applicable to damage caused by a nuclear accident. Under Article 1 of the 6 February 1963 agree-

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[166] Article XIII (2) of the 1997 Supplementary Compensation Convention.

[167] Article XIII (5) and (6) of the 1997 Supplementary Compensation Convention.

[168] Article X (1) of the 1962 Brussels Nuclear Ships Convention.

[169] Para. I, Exchange of Notes Concerning an Agreement between the United States of America and Italy Concerning Liability During Private Operation of *N.S. Savannah*, Rome, 16 December 1965, UNTS, Vol. 574, 1966, p. 139; Article 5 of the 1963 agreement between the United States and the Netherlands; para. I (2) (3), Exchange of Notes Concerning an Agreement between the United States of America and Ireland Relating to Public Liability for Damage Caused by the *N.S. Savannah*, Dublin, 18 June 1964, UNTS, Vol. 530, 1965, p. 217; Article VIII of the 1964 with Italy and paragraph 3 of the 18 June 1964 agreement with Ireland. Article 5, US and Netherlands agreement provides that '[t]he United States agrees to submit to the proceedings before any competent court of the Netherlands or before any other body established under Netherlands law for the purpose of considering and determining liability for damage as described in Article 1'. Also the agreements between Germany and Brazil recognise the jurisdiction of the Brazilian courts in the case of an accident being caused by the German nuclear ship *Otto Hahn*. Article 9 (1) of the 7 June 1972 agreement between the Federal Republic of Germany and Brazil provides that '[a]ny action for compensation for nuclear damage shall be brought before the Brazilian Courts'. The Treaty between the Federal Republic of Germany and the Federative Republic of Brazil Concerning the Entry of Nuclear Ships Into Brazilian Waters and Their Stay in Brazilian Ports, UNTS, Vol. 966, 1974, p. 183.

ment between the United States and the Netherlands, the competent court for compensation for nuclear damage caused by a nuclear accident by the *N. S. Savannah* is any competent court of the Netherlands or a commission established under Netherlands law for that purpose, and the principles of law which exist at the time of a nuclear accident apply to the United States. Similarly, Article VIII of the 1964 agreement between the United States and Italy provides for the application of Italian law and the Italian courts to have competence with regard to claims for compensation for damage caused by a nuclear accident by the *N.S. Savannah*. Similar provisions are provided for under the bilateral agreements related to the German *N.S. Otto Hahn*. According to the Treaty between Germany and Liberia, jurisdiction over claims for compensation lies with the Liberian Courts and judgements issued by these courts are recognized and enforceable in Germany.[170]

9.4.2.2.2.2 Assessment of compensation under the general rules of international law

The assessment of compensation for environmental damage caused by a nuclear activity is a major problem because there are no criteria in international law to assess the compensation. This also applies particularly in the case of an assessment for compensation for the violation of a State to its international obligations, as there is no particular method to assess the damage resulting from an illegal act committed or omitted by the State in monetary terms.[171] In the absence of such criteria, international tribunals and courts apply the methods developed to determine compensation in the civil law system.[172] These methods are taken by international courts as a guide for determining the amount of compensation under international law. This is because compensation for damage should be determined according to the rules of international law and not national law. Thus the matter is in the hands of the court unless an agreement determines the total sum of compensation.

The court has to determine the amount of compensation and the time for assessing the damage. According to the above-mentioned judgment in the Chorzów Factory Case, compensation should eliminate all the damage caused by the illegal act.[173] The compensation must cover all the original

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[170] Articles 18 (1) and 19 of the Treaty between the Republic of Liberia and the Federal Republic of Germany on the Use of Liberian Waters and Ports by the *N. S. Otto Hahn*, Bonn, on 27 May 1970, Bundesgesetzblatt, Teil II, 21 July 1971, No. 34, pp. 953-959.

[171] Brownlie, 1983, at p. 199-200.

[172] Graefrath, RDC, Vol. 185, Part II, 1984, at p. 94.

[173] PCIJ, Series A, No. 17, (1928), at p. 47. 'The case arose after the end of World War I, when Upper Silesia, which had previously been German territory, became part of Poland. A German corporation had established a nitrate factory at Chorzów in Upper Silesia pur-

damage caused to the injured State, also including interest, economic loss and other related damage,[174] restoring the situation to that which existed before the damage took place and settling the matter according to the principles of justice and equity.[175] This means that the damages must be assessed in a way that allows the damage to be removed and restores the situation into *status quo ante*.[176] However, as regards the time within which compensation for the damage and the interest should be assessed by the court, this is based on the date on which the damage occurred.[177] This was indicated by the ICJ in the Corfu Channel Case, (Assessment of the Amount of Compensation). It stated: 'The Court considers the true measure of compensation in the present case to be the replacement cost of the *Saumarez* at the time of its loss'.[178] These rules are applied by the court in each individual case and the judge decides how experts assess the damage.

These rules are not sufficient to determine the amount of compensation for transboundary environmental damage, which should be assessed on the basis of new standards. This is because it is difficult, for example, to provide an accurate assessment of compensation for pure environmental damage or pure economic loss or the costs of preventive or reinstatement measures.[179] It is also because environmental damage can spread across many countries and can be associated with damage to persons and property, as well as moral damage.

> 'Compensation can be awarded for damage to the environment of a State, such as by pollution.

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suant to a contract with the German Government. However, the new Polish Government took possession of the factory. Germany sought reparation'. McCorquodale and Dixon, 2003, at p. 445. However, 'in estimating the damage caused by an unlawful act, only the value of property, rights and interests which have been affected and the owner of which is the person on whose behalf compensation is claimed, or the damage done to whom is to serve as a means of gauging the reparation claimed, must be taken into account'. McCorquodale and Dixon, 2003, at p. 445.

[174] YILC, 1989, Vol. II, Part One, at p. 24, para. 81.

[175] According to Article XII of the 1972 Space Liability Convention: 'The compensation which the launching State shall be liable to pay for damage under this Convention shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred'.

[176] Christol, AJIL, Vol. 74, No. 2, 1980, at p. 358.

[177] YILC, 1989, Vol. II, Part One, at p. 24, para. 82.

[178] ICJ Reports 1949, p. 249.

[179] Sands, 2003, at p. 883.

> Compensation is for actual loss: unlike some domestic laws, international law has no settled concept of penal or exemplary compensation. How the amount of compensation is assessed will depend on the content of the relevant primary rules and the behaviour of the States concerned, the aim being to reach an equitable and acceptable outcome. The valuation of capital is a particular problem. Expropriation of assets gives rise to special difficulties'.[180]

Therefore, a suggestion was made to establish new criteria for the assessment of environmental damage caused by such activities.[181] This took place during the codification of the topic of international liability for lawful activities not prohibited by international law. The Special Rapporteur Barboza stated:

> 'Harm in the present context was not assessed only in its individual physical dimensions, but also in relation to certain factors that would be enumerated. Such an assessment of harm was another difference between the present topic and that of State responsibility; for the activities dealt with in the present context were not prohibited and the preventive measures might impose a heavy financial burden on the State of origin, a factor which should not be ignored in the assessment of pecuniary damages'.[182]

Certain international cases awarded general compensation, but other cases related to environmental damage deserve a mention and serve as a guide in nuclear cases. In the Dickson Car Wheel Company case, (USA) v United Mexican States, the Government of Mexico was obliged to pay compensation for using the state-owned railways and property. According to paragraph 9 of the 1925 Agreement, the Government of Mexico agreed to establish a commission of experts to determine the amount of physical damage caused by the Railways. Accordingly, '[t]he Appraisal Commission, on May 29,

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[180] Aust, 2010, at p. 387.

[181] The Institute of International Law suggested the establishment of additional criteria to assess irreparable environmental damage. Article 25 of the Draft Articles on "Responsibility and Liability under International Law for Environmental Damage" adopted by Institute of International Law in Session of Strasbourg in 1997 provides that: 'The fact that environmental damage is irreparable or unquantifiable shall not result in exemption from compensation. An entity which causes environmental damage of an irreparable nature must not end up in a possibly more favorable condition that other entities causing damage that allows for quantification.
Where damage is irreparable for physical, technical or economic reasons, additional criteria should be made available for the assessment of damage. Impairment of use, aesthetic and other non-use values, domestic or international guidelines, intergenerational equity, and generally equitable assessment should be considered as alternative criteria for establishing a measure of compensation. Full reparation of environmental damage should not result in the assessment of excessive, exemplary or punitive damages'.

[182] YILC, 1988, Vol. II, Part Two, at p. 21, para. 96.

1929, rendered its decision conformably to which the Government agreed to the sum of $15,000,000.00 for the physical damage'.[183] In the *I'm Alone* case, which is related to compensation for a wrongful act, the Commissioners considered the act of sinking the ship by the officers of the United States Coast Guard to be unlawful and asked the United States to formally acknowledge the illegality of that act and to pay the sum of $25,000 to Canada for material damage caused to the ship.[184] In the Corfu Channel case, the ICJ awarded the UK compensation for the loss of a ship, the cost of repairs, and expenses arising from personal injury and death. The amount of compensation claimed by the UK amounted to a total sum of £843,947, including £700,087 for the loss of the ship the *Saumarez*, £93,812 for the *Volage* and £50,048 for death and personal injuries.[185] The experts estimated the total damage at a sum of £716,780. However, the Court found that the amount of compensation claimed by the UK was reasonable and founded, although it could not award more than the amount that was claimed.[186]

The assessment of compensation for environmental cases is reflected more clearly in the Trail Smelter case, which is the case most often used as an analogy of environmental damage caused by nuclear activity.[187] The United States and Canada agreed to submit the dispute to arbitration after private attempts failed to resolve it.[188] The Tribunal awarded compensation estimated at US$350,000 to the US for damage caused by the Smelter from 1 January 1932 and during the period that the Smelter was in operation.[189] This is the amount of compensation agreed upon by the parties according to Article 1 of the special agreement between them (Convention for Settlement of Difficulties Arising from Operation of Smelter at Trail). The Tribunal did not refer to environmental damage. However, according to Sands, pure environmental damage is involved in 'uncleared land'.[190] Furthermore, on the basis of Article XI of the Convention, the Tribunal awarded the US $7,500 per year as compensation to determine what damage had occurred, but only when the two Governments determined under Article XI of the Convention

[183] RIAA, Vol. IV, at p. 677.
[184] *S.S. I'm Alone*, (Canada, United States), 30 July 1933 and 5 January 1935, RIAA, Vol. III, pp. 1609-1618, at p. 1618; García Amador, Sohn and Baxter, 1974, at p. 148.
[185] Corfu Channel, (Assessment of the Amount of Compensation due from the People's Republic of Albania to the United Kingdom of Great Britain and Northern Ireland), ICJ Reports 1949, p. 244, at p. 247.
[186] ICJ Reports 1949, p. 244, at p. 249.
[187] Handl, 2006, at p. 126.
[188] Kaplan, LLAICLJ, Vol. 10, 1988, at p. 255.
[189] RIAA, Vol. III, at p. 1960.
[190] Sands, 2003, at p. 885.

that damage has occurred in the year in question.[191] However, after the arbitration commission completed its report the victims did not receive compensation for the damage for thirteen years because the US refused to accept the report.[192]

A more recent case concerns the Iraq and Kuwait dispute over compensation for environmental damage caused by Iraq during the occupation of Kuwait. As mentioned above, the UN Security Council Resolution 687 of 3 April 1991 reaffirmed the State responsibility of Iraq for environmental damage caused as a result of the unlawful occupation of Kuwait and obliged Iraq to pay compensation for environmental damage caused to Kuwait and other countries. As Paragraph 16 of the resolution stated, Iraq 'is liable under international law for any direct loss, damage-including environmental damage and the depletion of natural resources or injury to foreign Governments, nationals and corporations as a result of its unlawful invasion and occupation of Kuwait'. However, the Resolution did not define the concept of environmental damage and the amount of compensation. It provided for the creation of a compensation commission to administer the funds.[193] This case is important because '[t]he largest environmental claims have been processed by the UNCC which has awarded some US$5.2 billion in respect of over 100 claims. These awards were in respect of damage and the depletion of natural resources in the Persian Gulf including costs incurred by Governments outside of the region assisting States affected by the damage'.[194]

9.4.2.2.3 Claims for compensation for environmental nuclear damage

Unfortunately, no cases of compensation for nuclear damage have been awarded by international courts to serve as precedents for the courts to assess compensation for environmental damage in nuclear cases. As we will see below, in state practice compensation has been paid on an *ex gratia* basis. In other cases compensation was paid by national courts. These cases indicate the amount of compensation paid by the State for damage caused by major nuclear accidents. They can serve as precedents for the basis for assessing the amount of compensation for environmental damage caused by a nuclear accident. The earliest cases relating to compensation for nuclear damage are claims for damage caused by the United States in relation to nuclear tests conducted in the Marshall Islands. During the period from 30 June 1946 to 18 August 1958, the United States conducted 43 atmospheric nu-

[191] RIAA, Vol. III, at p. 1980.
[192] Kaplan, LLAICLJ, Vol. 10, 1988, at p. 255.
[193] Para. 18 of Resolution 687.
[194] Barker, 2010, at p. 604.

clear tests in the Marshall Islands, which contaminated the two islands of Bikini and Enewetak and other surrounding islands with radioactivity.[195] As a result, the residents had to move 140 miles away.[196] The Bikini Island remains uninhibited to this day, while the people of Enewetak returned on 1 October 1980, after spending 33 years in exile in Ujelang. During that time the inhabitants suffered from malnutrition and other hardships and a large part of the Enewetak Island remains contaminated by radioactivity and is still uninhabited.[197] In addition, 27 Japanese crew members on the fishing ship Fukuryu Mara were exposed to radiation when the US conducting a hydrogen bomb test on 1 March 1954. As a result, one of the crew died and the others suffered serious injuries.[198]

In 1955, the United States paid compensation to Japanese crew members, based on *ex gratia* payments, for damage resulting from the tests while they were fishing near the Marshall Islands in March 1954, while not admitting its legal responsibility.[199] It paid two million dollars for the personal injuries suffered by the crew and for the damage caused to the Japanese fishing industry.[200] A letter from the United States Government to the Japanese Government on 4 January 1955 stated that:

> '… The Government of the United States of America has made clear that it is prepared to make monetary compensation as an additional expression to its concern and regret over the injuries sustained…
>
> …the United States of America hereby, tenders ex gratia, to the Government of Japan, without reference to the question of legal responsibility, the sum of two million dollars for purposes of compensation for the injuries or damages sustained as a result of nuclear tests in the Marshall Islands in 1954'.[201]

On 16 July 1990, the people of Enewetak filed claims for compensation with the Marshall Islands Nuclear Claims Tribunal for damage caused by the nuclear tests carried out by the United States between 1946 and 1958. The Tri-

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[195] Marshall Islands Nuclear Claims Tribunal: In the Matter of the People of Enewetak, 13 April 2000, 39 ILM (2000), at p. 1214.

[196] Dick Thornburgh, Glenn Reichardt, Jon Stanley, Kirkpatrick & Lockhart LLP, "The Nuclear Claims Tribunal of the Republic of the Marshall Islands: An Independent Examination and Assessment of Its Decision-Making Processes", Washington D.C., January 2003, at p. 5, available at: http://www.yokwe.net/ydownloads/ThornburgReport.pdf (accessed on 23.2.2012).

[197] Thornburgh, Reichardt, Stanley, Kirkpatrick & Lockhart, 2003, at p. 7.

[198] Emanuel Margolis, "The Hydrogen Bomb Experiments and International Law", in: YLJ, Vol. 64, No. 5, 1955, pp. 629-647, at p. 652.

[199] Birnie, Boyle and Redgwell, 2009, p. 518.

[200] Margolis, YLJ, Vol. 64, No. 5, 1955, at p. 653.

[201] Cited in Flores, 1995, at p. 251.

bunal dealt with claims for loss of use from 24 and 27 January 1997 and claims for rehabilitation and other consequential damage from 14-22 April 1999.[202] On April 13, 2000, the Tribunal issued its decision on the claims. The decision obliges the United States to pay a sum of compensation amounting to a total of $324,949,311 to the people of Enewetak for the damage they suffered and future damage that might be caused as result of the tests. This includes '$199,154,811 for past and future loss of use of Enewetak Atoll to claimants. It further includes $1,710,000 to restore Enewetak to a safe and productive State. Finally, it includes $34,084,500 for the hardships suffered by the people of Enewetak as a result of their relocation attendant to their loss of use'.[203] However, 'it is unclear whether the compensation included an amount for damage to the marine environment or loss of environmental amenity'.[204]

In the case of the 1957 Windscale accident, a significant number of farmers received approximately £50,000 compensation from the UK Government for the damage they suffered.[205] This compensation was paid by the government to assist the farmers, but no regime of liability was applied.[206] However, the accident caused harmful transboundary environmental damage to the neighbouring countries, i.e., Belgium, the Netherlands, Denmark, France, Norway and Sweden.[207] None of the injured States claimed compensation for the damage they suffered as a result of the accident.

In the 1978 Cosmos 954 accident, the process of cleaning up and removing the satellite debris took six months and cost $CDN 14 million.[208] Nego-

[202] 39 ILM (2000), at p. 1214. For the claims, see Davor Pevec, "Marshall Islands Nuclear Claims Tribunal: The Claims of the Enewetak People", in: DJILP, Vol. 35, No. 1, pp. 221-239; David Pevec, "The Enewetak People: Nuclear Testing: Displacement and Land Damage Claims" in: Heinz Stockinger, Jon M. Van Dyke, Michael Geistlinger, Sarah K. Fussek and Peter Machart (eds.), Updating International Nuclear Law, papers derived from the Conference on the Human Right to a Safe Environment and the Responsibility under International Law of Operators of Nuclear Facilities, held in Salzburg, Austria, October 20-23, 2005, Verlag, Intersentia 2007, pp. 243-258; Thornburgh, Reichardt and Stanley, 2003.

[203] 39 ILM (2000), p. 1214, at p. 1229.

[204] Sands, 2003, at p. 887.

[205] Tromans and FitzGerald, 1997, at p. 29.

[206] For the accident see Richard Batten, "A Significant Moment in the Development of Nuclear Liability and Compensation: Dealing With the Consequences of the Windscale Fire 1957", available at: http://humanities.exeter.ac.uk/media/universityofexeter/collegeofhumanities/history/exhistoria/volume3/4_-_Richard_Batten_Ex_Historia_2011.pdf (accessed on 15.8.2012).

[207] PAN American Union, 1962, at p. 46.

[208] Bulkeley, 1989, at p. 190.

tiations between the Canadian and the USSR authorities regarding the payments for the damages began in January 1979 and took approximately twenty-two months. The payment for the damages was based on the 1972 Convention on International Liability for Damage Caused by Space Objects, other agreements between the two parties, particularly the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies and the general principles of international law.[209] The total claim for costs, as mentioned, was $CDN 6 million. However, after long negotiations the USSR agreed to pay only half of this amount.[210]

In the case of the 1986 Chernobyl accident, no State affected by the accident brought claims for compensation against the USSR before international courts. As mentioned, the damage caused by the accident affected many countries. However, if a case had been brought before an international court, it would have been difficult to assess the environmental damage caused by the accident, because there was no clear standard for the method of assessment. Therefore it is difficult for the court to provide an accurate assessment of the amounts of compensation required, particularly as regards the transboundary environmental damage caused by a nuclear activity. This requires new methods of assessment using the new technology. However, it was suggested that the USSR would compensate the victims of the Chernobyl accident in a way comparable to the Cosmos 954 accident.[211] The accident caused the affected States heavy losses, including economic losses suffered by Belarus estimated at US$235 billion.[212] However, the USSR did not pay compensation for this damage. The victims of the accident were paid compensation by their governments in accordance with the national law and on the basis of the nuclear liability conventions.[213] For example, following the accident and up to 10 September 1986, the Federal Office of Administration in Germany received 301,811 applications for claims for compensation.[214] One year after the acci-

[209] Brownlie, 1983, at p. 280-282.
[210] ILM, Vol. 18 (1979), pp. 902-930; Louise De La Fayette, "The Concept of Environmental Damage in International Liability Regimes", in: Michael Bowman and Alan Boyle, Environmental Damage in International and Comparative Law: Problems of Definition and Valuation, Oxford University Press, New York, 2002, pp. 149-189, at p. 172; Birnie, Boyle and Redgwell, 2009, at p. 229.
[211] Kaplan, LLAICLJ, Vol. 10, 1988, at p. 249.
[212] Van Dyke, DJILP, Vol. 35, No. 4, 2006, at p. 34.
[213] Birnie, Boyle and Redgwell, 2009, p. 518; Hanqin, 2003, at p. 92; NEA, Nuclear Legislation in OECD Countries, 2003.
[214] Werner Eich, "The Compensation of Damage in Germany Following the Chernobyl Accident", NEA, Indemnification of Damage, 2003, pp. 89-116, at p. 103.

dent this number had increased to 313,000 applications. A total of 291 million DEM was paid in compensation and only 4,500 cases were rejected, of which 57 went into appeal before the administrative court of Cologne.[215]

As regards compensation for damage caused by the 1979 Three Mile Island accident, on 9 April 1979, the victims started filing claims for compensation before the courts of Pennsylvania. The allegations mainly concerned interruption of business, loss of wages, cancer and fear of cancer, economic loss, evacuation and other illnesses.[216] However, no environmental damage was considered, only the loss of wages as a result of an imminent danger of contamination by the accident.[217] The compensation was initially estimated at approximately US$1 billion. This included the financial cover provided by two US pools estimated at US$300 million, third party liability insurance provided by the pools for approximately US$50 million, including claims for loss of earnings and the interruption of business of approximately US$20 million. This was settled in 1981. The recovery operation also cost US$5 million for the long-term medical surveillance for inhabitants living in the area of the accident. Other claims were also brought for psychological damage and expenses incurred by municipalities. By 1996, approximately US $56 million had been paid in settlements for compensation and the costs of handling claims.[218] In addition, 2,200 claims for punitive damages related to bodily injury, emotional distress and other damage were not settled because they were considered to have no merit.[219]

Compensation for nuclear damage caused by the 1999 Tokaimura accident in Japan was mainly for personal injuries, physical and mental effects, medical examination expenses of people affected by the accident, evacuation expenses such as transportation, hotel and other incidental expenses, the examination of expenses related to property, contaminated property, loss of income and business.[220] On 22 October 1999, the Japanese Government established a Dispute Reconciliation Committee for Nuclear Damage Compensation to assess the compensation required for the damage caused by the accident. It also created a Special Consultation Centre in the Ibaraki Prefecture Office from 31 January to 25 February 2000 to negotiate with the victims

[215] Eich, 2003, at p. 105.
[216] Hannay, 1988, at pp. 153-154.
[217] Quattrocchi, 2000, at p. 390.
[218] Tromans and FitzGerald, 1997, at p. 30.
[219] Quattrocchi, 2000, at p. 390.
[220] Study prepared by the Secretariat of the OECD/NEA on "Tokai-Mura Accident, Japan: Third Party Liability and Compensation Aspects", in: NLB, No. 66, 2000, pp. 13-21, at p. 15-16.

about claims for compensation.[221] By 30 September 2000, 7,025 claims had been filed by victims of the accident and these had been settled; 98% of these claims (6,885 claims) were settled for a total amount of compensation of 12.68 billion Yen. They were paid by JCO, the operator of the plant and a subsidiary of Sumitomo Metal Mining Co. (SMM) of Tokyo, which owned the plant. The insurance company paid only one billion Yen, the amount of the insurance coverage.[222]

The 2011 Fukushima nuclear power plant is operated by Tepco (Tokyo Electric Power Company), which is liable for the damage caused by the accident under Japanese nuclear law. Japan is not a party to any nuclear liability convention. However, Tepco is in a difficult position because it has suffered heavy losses as a result of the accident. The amount of compensation required to compensate victims of the accident is not yet known. After the accident analysts estimate that it will exceed $100bn.[223] However, recent assessment, as mentioned above, estimated it to be approximately $235 billion.[224] Telco initially requested a loan of 2 trillion Yen ($24.8bn) and expected to pay initial compensation of 50 billion Yen ($620m) to the residents evacuated from the area around the plant.[225] The government of Japan has approved a plan to use taxpayers' money to pay more than $60bn to compensate victims of the accident.[226]

9.4.2.3 Satisfaction as a means of reparation for environmental nuclear damage

Satisfaction is the third form of reparation for damage caused by a wrongful act and is provided by the responsible State to the injured State where the damage cannot be repaired by restitution or compensation.[227] According to

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[221] NEA, Secretariat, NLB, No. 66, 2000, at p. 15.

[222] NEA Secretariat, NLB, No. 66, 2000, at p. 16, 17, 21; The Secretariat of the OECD Nuclear Energy Agency, "Tokai-Mura Accident, Japan: Third Party Liability and Compensation Aspects", in: NEA, Indemnification of Damage, 2003), 2003, pp. 126-145, at pp. 129, 130 and 131.

[223] Japan "to review nuclear energy policy" over nuclear crisis, http://www.bbc.co.uk/news/world-asia-pacific-13346537 (accessed on 28.2.2012).

[224] Thom Brooks, "After Fukushima Daiichi: New Global Institutions for Improved Nuclear Power Policy", at p. 2, available at: http://ssrn.com/abstract=1973494 (accessed on 19.1.2012).

[225] Japan crisis: Tepco agrees conditions for State aid, http://www.bbc.co.uk/news/world-asia-pacific-13360758 (28.2.2012).

[226] Japan's government approves Tepco compensation Scheme, http://www.bbc.co.uk/news/business-13385512 (accessed on 13 May 2011).

[227] Article 37 (1) of the 2001 ILC Draft Articles on State Responsibility.

Brownlie, '[s]atisfaction may be defined as any measures which the author of a breach of duty is bound to take under customary law or under an agreement by the parties to a dispute, apart from restitution or compensation. Satisfaction is an aspect of reparation in the broad sense'.[228] It is aimed at the reparation of material and moral or legal or political damage caused by a wrongful act,[229] including a loss of honour or dignity or prestige of the injured State.[230] Thus, where appropriate, satisfaction is a legal consequence of State responsibility for a violation of its environmental and nuclear obligations. For example, the use of a nuclear reactor is a hazardous activity and is only allowed under international law for peaceful ends. However, if the Installation State uses it for production of nuclear weapons and later admits the wrongfulness of such act and dismantles the programme at the request of the international community, this is considered satisfaction. When it used nuclear energy for non-peaceful uses, Libya was a clear example of this, but it subsequently admitted and agreed to dismantle its nuclear and biological programme on 19 December 2003.[231] The use of nuclear energy for non-peaceful purposes is against international law, but when Libya dismantled its programme, it satisfied the international community. In this case, satisfaction was an appropriate form of reparation for the wrongful acts of the State.

This may be an appropriate way of repairing environmental damage where such damage could not be repaired by means of restitution and compensation. As Boyle pointed out, '[w]here neither restoration nor compensation for damage to the environment are appropriate then satisfaction is left as the only means of affording some nominal redress'.[232] Thus, satisfaction is a means of reparation for damage caused by lawful and unlawful acts.

There are some cases in international practice which show that application of satisfaction can be a form of reparation for damage cased by lawful and unlawful activities. In the Pulp Mills case, '[t]he Court considers that its finding of wrongful conduct by Uruguay in respect of its procedural obligations per se constitutes a measure of satisfaction for Argentina. As Uruguay's breaches of the procedural obligations occurred in the past and have come to an end, there is no cause to order their cessation'.[233] In nuclear

[228] Brownlie, 1983, at p. 208.
[229] YILC, 2001, Vol. II, Part Two, at p. 106, para. 3, commentaries to Article 37; Smith, 1988, at p. 49.
[230] YILC, 1993, Vol. II, Part Two, at p. 77.
[231] Libyan Nuclear Weapons, available at: http://www.globalsecurity.org/wmd/world/libya/nuclear.htm (accessed on 23.2.2012).
[232] Birnie, Boyle and Redgwell, 2009, at p. 231.
[233] Case Concerning Pulp Mills the River Uruguay (Argentina v. Uruguay), ICJ, 20 April 2010 Judgment, at p. 76, para. 269.

cases, satisfaction as a consequence of liability was demanded by Australia in the nuclear test case (Australia and New Zealand v France). Australia asked the Court to declare that France had breached the rules of international law because '[t]he deposit of radio-active fall-out on the territory of Australia and its dispersion in Australia's airspace [was] without Australia's consent'.[234] The ICJ, as mentioned above, stated that there are no rules in international law stating that conducting nuclear tests is unlawful and consequently environmental damage in Australia caused by radioactivity should be based on strict liability which requires compensation as a legal consequence of the damage. However, when France conducted the tests in violation of Australia's sovereignty, this was an unlawful act. Furthermore, as mentioned above, in the Chernobyl case the USSR blamed the staff for causing the accident and declared only its moral responsibility. In my opinion, this declaration does not constitute satisfaction for damage caused by the accident to the injured States. The accident caused considerable damage to persons, property and the environment worldwide and some victims are still suffering as a result. This cannot be repaired merely by a declaration of moral responsibility – at the time, the USSR denied legal responsibility.

Under international law, satisfaction can take different forms which can apply in the case of a violation by a State of its environmental and nuclear obligations, or in the case of environmental damage caused by a nuclear accident. These include official apologies, statements of regret,[235] declarations of wrongfulness,[236] or any other appropriate form of satisfaction, such as the

[234] Application Instituting Proceedings Submitted by the Government of Australia, ICJ Pleadings, Oral Arguments, Documents, Nuclear Tests Cases, Vol. I, (Australia v. France), 1978, Vol. 1, at p. 14, para.49 (iii), cited in Willisch, 1987, at p. 67.

[235] For instance, in the *I'm Alone* Case, the decision of the Tribunal stated that, '[t]he act of sinking the ship, however, by officers of the United States Coast Guard, was, as we have already indicated, an unlawful act; and the Commissioners consider that the United States ought formally to acknowledge its illegality, and to apologize to His Majesty's Canadian Government therefore; and, further, that as a material amend in respect of the wrong the United States should pay the sum of $25,000 to His Majesty's Canadian Government; and they recommend accordingly'. The *S.S. I'm Alone* (Canada, United States), 30 June 1933 and 5 January 1935, RIAA, Vol. III, p. 1609, at p. 1618.

[236] In the Corfu Channel Case, the ICJ stated that '…the United Kingdom violated the sovereignty of the People's Republic of Albania, and that this declaration by the Court constitutes in itself appropriate satisfaction'. Corfu Channel case, Judgment of April 9th, 1949, ICJ Reports 1949, p. 4, at 36. As the commentaries mentioned, every court or tribunal has jurisdiction to issue a declaration of illegality of the act in question. (YILC, 2001, Vol. II, Part Two, at p. 107, para. 6, commentaries to Article 37) A declaration by the court is obligatory to the responsible State. However, in my opinion, an official declaration which is considered as a form of satisfaction should be issued by the responsible State to recognize its legal responsibility for damage caused by its illegal acts vis-à-vis

punishment of the responsible persons[237] or a symbolic payment for damages, e.g., for non-pecuniary damage suffered by the affected State.[238] These forms of satisfaction were adopted by the ILC Draft Articles on State responsibility and recognized in state practice.[239] However, they are merely examples and choosing an appropriate form of satisfaction depends on the particular circumstances.[240] However, the dignity and sovereign independence of the State limit the use of forms of satisfaction.[241] Therefore, an appropriate form of reparation should not cause humiliation to the responsible State.[242] Usually the injured State gets satisfaction through diplomatic channels, for example, an official apology by the responsible State or a declaration of non-repetition of the illegal act, and in some cases it gets satisfaction by judicial means if the satisfaction is an amount of compensation for damage or loss and the claim was brought before an international court.[243] The latter case is controversial because it is difficult to differentiate between compensation as a form of satisfaction and where it is restitution or compensation for material damage caused by a wrongful act.[244] As Brownlie said:

> 'However, it is not easy to distinguish between pecuniary satisfaction and compensation in the case of breaches of duty not resulting in death, personal injuries, or damage to or loss of property. Claims of this sort were formally expressed as a claim for an 'indemnity'. If there is a distinction, it would seem to be in the intention behind the demand. If it is predominantly that of seeking a

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international law and accepted by the affected State as a judicial consequence for liability for the resulting damage. This is because a declaration by the court of the illegality of the act may not satisfy the injured State or the State responsible may have to use other form of satisfaction.

[237] Case concerning the differences between New Zealand and France arising from the *Rainbow Warrior* affair, Ruling of 6 July 1986 by the Secretary-General of the United Nations, RIAA, Vol. XIX, pp. 199-221, at p. 214.

[238] According to Article II of the Protocol of 13 February 1903 relating to the establishment of the Mixed Claim Commission between Italy and Venezuela, '[t]he Venezuelan Government agrees to pay to the Italian Government, as a satisfaction of the point of honour, the sum of £5,500 (five thousand, five hundred pounds sterling), in cash or its equivalent, which sum is to be paid within sixty days'. Mixed Claims Commission (Italy-Venezuela), Constituted under the Protocol of 13 February and 7 May 1903, RIAA, Vol. X, p. 477, at p. 479.

[239] Article 37 (2) of the 2001 Draft Articles on State Responsibility.

[240] YILC, 2001, Vol. II, Part Two, at p. 106, para. 5, commentaries to Article 37.

[241] Eric Wyler and Alain Papaux, "The Different Forms of Reparation: Satisfaction", in: Crawford, Pellet and Olleson (eds.), 2010, pp. 623-637, at p. 635.

[242] Article 37 (3) of the 2001 ILC Draft Articles on State Responsibility.

[243] Starke, 1989, at p. 293.

[244] Wyler and Papaux, 2010, at p. 631.

token of regret and acknowledgement of wrongdoing then it is a matter of satisfaction'.[245]

In conclusion, satisfaction is an effective means for protecting the environment from damage caused by nuclear activities where it takes the form of monetary compensation or a declaration by the State of non-repetition of the wrongful act that was committed. The first is aimed at repairing the material damage caused by a lawful or unlawful act, while the second is aimed at repairing the moral damage caused by an unlawful act. This means that satisfaction can be effective not only for moral damage caused as a result of the violation of nuclear and environmental obligations, but also in the case of material damage caused to the environment by a nuclear accident. For example, satisfaction can be considered an affective means to repair nuclear damage in the case of a breach of environmental and nuclear obligations in the case of the occurrence of one the circumstances precluding wrongfulness because these circumstances are out of the hands of the State. If a nuclear accident has occurred as a result of an earthquake or *force majeure* and the State cannot repair the environmental damage caused by the accident, it could provide an official apology to the States that are affected. A statement of regret by the Accident State can satisfy and comfort the Injured State and its people because the circumstances which caused the accident are understandably out of the hands of the State.

9.5 Conclusions

This chapter showed that the legal consequences of international liability have been developed alongside the development of the rules of international liability. As a result, the concept of the consequences of international liability is no longer limited to the traditional concept of reparation, which only aims to remedy the resulting damage, but also includes the non-repetition of the illegal act and the prevention of the damage in the future. This is an important aspect in respect of the protection of the environment, particularly from damage caused by nuclear activities, which must be conducted under strict rules which prevent damage. The obligation of the State to repair environmental damage is aimed at restoring the environment to its previous condition before the occurrence of a nuclear accident, while the new role of liability is to prevent damage in the future. In that sense, State responsibility has a precautionary purpose. The preventive function of the legal consequences of liability is a primary obligation imposed upon the operator of a nuclear installation or the Installation State to carry out all the preventive

[245] Brownlie, 1983, at p. 208.

measures which prevent and minimize damage caused by a nuclear accident in order to avoid other legal consequences.

The legal consequences of State responsibility for the violation of environmental and nuclear obligations have been developed as a result of their development in the ILC Draft Articles on State Responsibility for Wrongful Acts, while the legal consequences of liability for damage caused by a nuclear accident are still mainly governed by the general rules of international law on strict liability, the civil liability regimes of the ILC Draft principles on the allocation of loss caused by hazardous activities, the nuclear liability conventions and other related conventions. The legal consequence of liability under these instruments is compensation for the resulting damage which also aims to prevent and remedy the damage.

Consequently, the legal consequences of international liability are varied and are applied in accordance with each type of liability. These consequences include the cessation of the illegal act, restitution, compensation and satisfaction, depending on the case concerned. Thus, not all forms of reparation apply in every case of liability for environmental nuclear damage. For example, the cessation of a nuclear activity is an appropriate consequence of State responsibility and is necessary if the Installation State violates the obligation of prevention. Furthermore, the cessation of an illegal act is an important consequence of liability in relation to the reparation of nuclear damage. The operation of a nuclear reactor is suspended if nuclear safety standards are violated or if stops disposing nuclear waste according to the rules of international law. Compensation is also appropriate and the most relevant form of reparation for international liability in the case of environmental damage caused by a nuclear accident. Under the nuclear liability conventions, it is the only legal consequence of nuclear liability. However, the major problem is that compensation for nuclear damage under these conventions is estimated per nuclear accident, and the amount of compensation is limited. In addition, the amount of compensation under the general rules of international law is unlimited, but the problem is that there are no criteria to assess environmental damage, particularly pure environmental damage and pure economic loss caused as a result of the impaired environment. Similarly restitution is important to restore the impaired environment to the *status quo ante*, but it is associated with compensation because the costs of reinstatement measures are considered to be compensation. On the other hand, restitution in kind cannot be considered an appropriate form of reparation for nuclear damage. It is difficult to return a piece of property damaged as a result of a nuclear accident or to restore the impaired environment to its previous condition. Finally, satisfaction can make a difference if the Accident State provides an official apology to the affected State for slight damage caused by a

nuclear accident, if the accident was caused by circumstances precluding wrongfulness or the apology is provided as a form of compensation which is accepted by the State affected by the nuclear accident.

PART IV:
SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

10 INTEGRATION OF INTERNATIONAL AND CIVIL NUCLEAR LIABILITY REGIMES FOR ENVIRONMENTAL DAMAGE CAUSED BY A NUCLEAR ACCIDENT

10.1 Introduction

This study aimed at providing an analytical, practical and theoretical framework for State responsibility and liability for environmental damage resulting from nuclear accidents caused by nuclear activities in accordance with the existing rules of international law. It was agreed that nuclear activities are extremely hazardous activities that are only allowed by international law because they are useful for the international community. However, because of the risks involved, they are governed by strict rules of international liability based on the principle of absolute liability, to remedy nuclear damage caused by nuclear accidents. This study raised the question whether the classical rules of international liability that are aimed only at remedying the damage are sufficient for the protection of the environment from damage caused by nuclear activities, or whether they should also be aimed at preventing the damage before it happens by preventing nuclear accidents and minimising their harmful consequences. More specifically, the study asked whether there is an obligation under international law for the State to prevent environmental nuclear damage caused to other States by nuclear activities carried out within its territory or under its jurisdiction or control, and to repair such damage. It also asked who is the responsible person, what regime of liability is applicable, and what are the bases and consequences of liability for environmental damage caused by a nuclear accident to other States. These questions formed the core of the study.

The study examined these issues in the light of the general rules of international law as codified by the ILC in its Draft Articles and principles on international liability and the nuclear liability conventions. These sources determined the rules governing liability for nuclear damage, which are composed of rules based on civil liability under the nuclear liability conventions and international liability under the general rules of international law. The study combined the examination of the issues of international liability and civil liability for nuclear damage and consolidated them rather than examining each regime in a separate part of the study. This was supported by the

fact that there are some common elements between the two regimes of liability. For example, the 2006 ILC Draft principles on the allocation of loss focused on the operator of the activity as being liable for damage caused by hazardous activities in terms of civil liability. These principles also involve principles of liability for damage caused by hazardous activities similar to those provided for in the nuclear liability conventions.

The previous chapters of the thesis investigated the matter and addressed the research questions of the study in four parts organized in ten chapters. The introductory chapter presented the various aspects of the contents of the study and the research issues. Chronologically and in accordance with the research questions, the study started in Part I with the examination and description of certain major nuclear accidents which have occurred in nuclear reactors, and the definition of the reparable environmental damage caused by a nuclear accident and its relationship with State liability. This is because environmental damage is an essential element and the main aspect to incur liability for damage caused by a nuclear accident, as without damage there is no liability. Part II examined the preventive functions of international liability for environmental nuclear damage. It examined the principle of prevention as an essential principle in international law. The principle obliges the State in whose territory a nuclear installation is located or under whose jurisdiction or control it is operated to prevent and minimize damage caused by such installations. It also addressed certain procedural obligations under international law which are necessary to apply the principle of prevention. These obligations are aimed at the safe operation of a nuclear installation and guarantee the performance of the nuclear installation in accordance with the regulations under international law. If a State respects these obligations this will help to prevent nuclear accidents, and their breach constitutes State responsibility for wrongful acts. Part III examined the rules of responsibility and liability under the general rules of international law to repair and remedy environmental damage caused by a nuclear accident. It first identified the liable person and the applicable regime of liability for nuclear damage. The applicable regime of liability is based on State responsibility for wrongful acts which applies in the case of the violation of nuclear and environmental obligations by the State, and the absolute liability of the State or the operator which applies in the case of environmental damage caused by a nuclear accident. These regimes oblige the State or the liable person to bear the consequences of international liability and responsibility to prevent and repair damage caused by a nuclear accident. Finally, Part IV includes this concluding chapter, which summarises the main arguments presented in the previous chapters, the general conclusions drawn in the study and gives some important recommendations. The following section provides a summary of the

conclusions of the study. Section 10.3 provides some recommendations to improve the existing regime of international liability for environmental damage caused by nuclear activities. Finally, section 10.4 provides the final conclusion, which states that the rules governing international liability for environmental damage should be composed of rules of civil and international liability integrated in one unified regime.

10.2 Summary of conclusions

The analysis of the previous chapters of the thesis came to the conclusion that under international law there is a general obligation upon the Installation State to take certain precautionary measures and to exercise due diligence to prevent environmental damage caused by hazardous activities, including nuclear activities carried out within its territory or under its jurisdiction or control, and to bear the legal consequences of the liability and repair the damage if it was unavoidable. It also concluded that the operator of a nuclear installation is primarily liable for nuclear damage and that the State is liable for the residual damage and for violations of its nuclear and environmental obligations. Moreover, it indicated that liability for environmental nuclear damage should be governed by a comprehensive civil and international liability regime that is aimed at preventing, reducing and redressing nuclear environmental damage caused by a nuclear accident.

On the other hand, it revealed that the issue of international liability for environmental damage caused by nuclear activities is complex and raises some difficult questions. It combined the most difficult issues in contemporary international law, including international liability, the environment and nuclear energy and showed that the related legal problems have not yet been adequately resolved. During the course of the past fifty years the ILC has embarked on an examination and codification of the classical rules of international liability of States. Nevertheless, it has failed to adopt either the liability of the State for environmental damage caused by hazardous activities or its liability in general. It has only succeeded in adopting the principle of State responsibility for wrongful acts. Furthermore, the liability for environmental damage caused by nuclear activities is governed by primary and secondary rules of international liability which are aimed at the prevention, mitigation and remedying environmental damage. The rules of prevention are primary rules and differ from those related to remedying the damage, which are secondary rules. The primary rules or obligations in relation to nuclear activities are the rules regulating the performance and control of the activity in order to prevent a nuclear accident and its harmful consequences, while the secondary rules are the rules of responsibility which apply in the

case of a breach of the primary rules and are aimed at the respect of these rules and at remedying environmental damage caused by these activities. Moreover, a nuclear accident does not cause only environmental damage, but also other damage, such as damage or loss to persons, property and economic loss. Finally, the roles of the operator and the State are interrelated as regards nuclear activities. Nuclear activities are carried out by private operators and the State. However, the majority of nuclear installations are operated by private operators and the State has a regulatory and supervisory role as regards these activities.

These general conclusions and other associated concluding remarks will be summarized in this section, which concludes that: the regime of nuclear liability has developed significantly particularly in the past decade (section 10.2.1); the element of damage is important to identify the liability for environmental damage (section 10.2.2); functions of international liability have been developed and are not only aimed at repairing the damage, but also at preventing the damage (section 10.2.3); and there are relationships between international liability under the general rules of international law, and the civil liability regime under the nuclear liability conventions that facilitate the composition of a nuclear liability regime comprising civil and international liability rules (section 10.2.4).

10.2.1 Progress and development of the rules and functions of liability

In general, the reason for the creation of new rules of liability is that the existing rules of liability are inadequate when applied to new issues, such as the new technologies, for solving the legal problems. There is no need to create new norms to govern a particular issue, unless the existing rules are inadequate. However, what is needed is the reformulation of these norms in a different form to apply to the new issues. This applies to the rules for the protection of the environment which has attracted the attention of the international community, particularly in the past fifty years, as a result of the increasing use of hazardous activities, particularly nuclear energy, which exposed the environment to danger. This meant that it was necessary to reformulate the existing general rules of international liability in a way that is applicable to environmental issues. This can be deduced from Principle 22 of the 1972 Stockholm Declaration, which exhorts States to cooperate to improve the existing rules of international law relating to liability and compensation, so that they apply to liability for environmental damage caused by activities harmful to the environment. Following the adoption of the Stockholm Declaration, the development of the rules of international liability for

environmental damage has been reflected in a number of international instruments which encourage States to cooperate in developing the rules of liability. This also applies with regard to the rules of international liability which were examined by the ILC and nuclear liability under the nuclear liability conventions which were recently amended by the contracting parties. This means that the rules of liability are already in existence, but they need to be reformulated to apply to liability for environmental damage.

The study demonstrated that the rules governing international liability for environmental damage caused by a nuclear accident were developed following the codification of the general rules of international law of liability by the ILC. Consequently, a number of international instruments, and substantive and procedural norms of liability for environmental damage have been developed. During the course of the codification, the Commission changed the approach to one of progressive development. This led to a change in the view of the doctrine of international law which was also reflected in international case law. These developments concerned the functions of international liability in general and liability for environmental damage in particular.

The efforts made by the ILC on the issue of international liability for injurious consequences arising out of acts not prohibited by international law were aimed at the formulation of a general principle of prevention and compensation. These were reflected in the 2001 Draft Articles on the prevention of harm caused by hazardous activities and the 2006 Draft principles on the allocation of loss. Under the principle of prevention, the State is required to take precautionary measures to prevent and minimize environmental damage caused by a hazardous activity. The Draft principles also addressed the issues of liability, such as the polluter pays principle, which addresses the issues of the prevention and repair of damage caused to the environment. These articles and principles codified the primary rules of international liability for lawful acts.

However, the 2001 ILC Draft Articles on State Responsibility for Wrongful Acts codified the secondary rules of international liability which were aimed at the liability and reparation of wrongful acts. These articles are one of the important topics adopted by the ILC and are considered to be a progressive development in international law, such as the law of treaties and the law of the sea. It is important to guarantee the application of the primary rules to environmental issues. State responsibility for wrongful acts forces the State to respect its international obligations by making it accountable for the violation of its obligations. This is an important aspect which makes it possible to prevent or reduce the occurrence of nuclear accidents and repair environmental damage caused to other States by a nuclear activity. This emphasizes the progressive development of the function of State responsibility

for wrongful acts which has two aspects, i.e., the preventive and corrective functions. As indicated in Part II, the violation of environmental obligations by a State constitutes the basis of State responsibility for the prevention and reduction of environmental damage caused by a nuclear accident, i.e., the preventive function of State responsibility.

Furthermore, State responsibility and liability aimed at the reparation and compensation for damage caused as a result of the violation of nuclear obligations, and damage caused by a nuclear accident to the environment, i.e., the corrective function of State responsibility, are based on the classical idea of international liability. The latter was the only function of State responsibility and liability. The new concept of State responsibility is certainly in the interests of protecting the environment as well as the State. It is in the interests of the environment because it helps to prevent nuclear accidents. The protection of the environment requires strict rules of liability. It is also in the interests of the State because it avoids damage and the reparation of damage when no nuclear accident has occurred. Consequently, the State will not pay for the costs of the reparation of environmental damage if it has taken preventive measures to avoid nuclear accidents.

Similar developments have been achieved with regard to the nuclear liability regime under the nuclear liability conventions. As a result of the amendments of these conventions, new instruments and provisions were introduced in the nuclear liability regime under the conventions. The existing norms governing nuclear liability apply more effectively to liability for nuclear damage, including damage caused to the environment. The purpose of nuclear liability under the nuclear liability conventions has developed in the same way as international liability. International and civil liability regimes are now aimed at the prevention, reduction and remedy of environmental damage caused by a nuclear accident. This has resulted in a comprehensive regime of nuclear liability for the protection of people and the environment from the hazards arising from nuclear energy. Before the amendments of the nuclear liability conventions, liability and compensation for nuclear damage caused by a nuclear accident were the main focus of the regime. This was the classical purpose of nuclear liability under the conventions, which were mainly aimed at providing adequate and equitable compensation to victims of a nuclear accident. Adequate compensation means that the regime provides full compensation for the damage suffered, while equitable compensation means that victims of a nuclear accident obtain compensation without discrimination based on nationality, domicile, or residence. However, after the amendments, the conventions were indirectly also aimed at the prevention and reduction of nuclear damage caused by a nuclear accident. The 2004 Amended Paris Convention and the 1997 Amended Vienna Convention cover the costs of measures to pre-

vent the nuclear damage caused by a nuclear accident. In addition, the 1997 Convention on Supplementary Compensation stipulates that the member States must apply the rules of nuclear safety. This demonstrates that the nuclear liability regime aims to be comprehensive to cover the issues of prevention, reduction and reparation of nuclear damage caused by a nuclear activity.

The philosophy behind the creation of a comprehensive nuclear liability regime is to eliminate nuclear damage caused by a nuclear accident to innocent victims in a way which strikes a balance between the situation before and after the nuclear accident. An effective liability regime achieves that aim without the occurrence of a nuclear accident. If there is no nuclear accident has occurred, the question of liability will not arise under the regime at all. However, the nuclear liability conventions do not contain any provisions on liability which oblige the operator of a nuclear installation and the Installation State to ensure nuclear safety standards. The 1986 Chernobyl accident and the 1999 Tokaimura nuclear accident in Japan occurred as the result of carelessness by the operating staff with regard to the application of nuclear safety standards and preventive measures, and as a result of the lack of supervision by the Installation State. If these standards had been carefully applied, these accidents might have been avoided. The prevention of nuclear accidents should be one of the main aims of any legal nuclear liability regime governing liability for nuclear damage caused by nuclear activities. This requires the adoption of provisions which hold the operator liable for breaches of safety standards and hold the Contracting States accountable for breaches of rules of international law. Therefore, future amendments to the nuclear liability conventions should introduce the provisions of liability that place the financial burden on the operator of the nuclear installation and the Installation State to ensure the implementation of nuclear safety standards. However, this differs from absolute liability which is the basis of liability for nuclear damage under the regime. The regime already includes provisions which oblige the Contracting Parties to respect the provisions of international law. Therefore, fault liability can apply in addition to absolute liability, but each applies when it is relevant in the particular case concerned.

In conclusion, the concept of international liability has developed and is aimed not only at serving a reparative function, i.e., liability and reparation, as in the classical concept of international liability, but is also aimed at preventive functions, i.e., the prevention and reduction of environmental damage. The latter encourages the State to take all the necessary preventive measures to prevent a nuclear accident caused by a nuclear activity, in order to avoid the responsibility which is preferable than to paying for the reparation of the damage afterwards. However, the former provides a corrective function for the victims of environmental damage. It provides the rules and

identifies the source of responsibility and liability in order to protect the rights of the victims or the injured party and to correct the situation, and strike a balance between the rights of the victims before and after the damage.

10.2.2 No liability without damage: The relationship between damage and liability

Chapter 2 of the study presented the factual background and a description of the major nuclear accidents that have taken place in nuclear reactors since they were first used. It outlined the nature and characteristics of transboundary environmental nuclear damage and classified nuclear accidents into three types: the "internal accident", when the risks and harmful consequences resulting from a nuclear event are limited to the nuclear installation; the "external accident", when the risks and harmful consequences of a nuclear event occur outside the nuclear installation, but are limited to the State in whose territory the installation is located; and the "transboundary accident", when the damage caused by a nuclear event spreads beyond the borders of the State and has transboundary implications. This classification corresponds to the geographical scope of the nuclear liability conventions and is also based on the risks associated with nuclear activity. On the basis of the risks involved, nuclear accidents are also classified into "non-nuclear accidents", when a nuclear event has no harmful consequences, "minor nuclear accidents", when a nuclear event has minor harmful consequences which are usually limited to the nuclear installation, and "major nuclear accidents", when a nuclear event has external or transboundary implications. This indicates that not every accident caused by a nuclear activity incurs the liability of the State. Only major nuclear accidents which have transboundary implications can incur State liability for environmental damage. Nuclear damage caused inside the installation is governed by ordinary law, while nuclear damage caused outside the installation is governed by the nuclear liability conventions, and transboundary damage is governed by the nuclear liability conventions and the general rules of international law.

The examination of the major accidents caused by nuclear reactors and their relation to the application of the nuclear liability regime to damage caused by nuclear activities revealed the following:

(1) The 1957 Windscale accident was the first major nuclear accident caused by nuclear activities for peaceful purposes which caused transboundary environmental damage. However, no international nuclear liability regime had been established at that time which was applicable to the

damage caused by the accident. Compensation for damage caused by the accident to the victims was provided by the British Government as assistance, and no environmental damage caused to other States was compensated because no State claimed for such damage. This accident revealed the urgent need for an international nuclear liability regime to compensate damage caused by nuclear accidents.

(2) The Cosmos 954 accident of 1978 was caused by a USSR space object which was operated by nuclear power. Nuclear waste and debris resulting from the accident spread over large areas in outer space and the earth, mainly affecting Canadian territory. The damage caused by the accident was not covered under the nuclear liability conventions because nuclear facilities, such as a means of transport, were excluded under those conventions. It was covered under the general rules of international law and the 1972 Space Liability Convention.

(3) The 1979 Three Mile Island accident was the first nuclear accident to draw the attention of the international community to the severe damage that could be caused by a nuclear accident. The damage caused by the accident was limited to the United States. It was covered by US law because the United States was not a party to any nuclear liability convention and no claims for environmental damage were presented. This revealed that ratification by the nuclear States is important to expand the scope of application of the nuclear liability conventions, particularly with regard to the United States, which owns a quarter of the reactors operating worldwide.

(4) The 1986 Chernobyl accident alerted the international community to the need to strengthen the international nuclear liability regime to provide equitable and adequate compensation to victims of a major nuclear accident. The damage caused by the accident affected many countries worldwide, particularly the European countries. However, compensation to the victims was paid by their governments according to national law, and no State made claims to international courts for the damage suffered. Furthermore, at the time of the accident the USSR had no nuclear liability legislation to cover third party liability claims and was not a party to any nuclear liability convention. The accident revealed that the rules of nuclear liability under the nuclear liability conventions and the general rules of international law were inadequate to apply to liability for damage caused by a major nuclear accident. It also revealed the need for a wide acceptance by the States of the international nuclear liability regime.

(5) The 1999 Tokaimura and the 2011 Fukushima nuclear accidents in Japan revealed that the amount of compensation required for nuclear damage caused by a major nuclear accident exceeds the amount of the operator's liability and his insurance under the nuclear liability conventions, even if the

damage caused by the accident is limited to the Accident State. The damage caused by these accidents was mainly limited to Japan, but other countries also suffered economic losses as a result of having to discard Japanese products. The damage caused by the two accidents was compensated by the operator under Japanese nuclear law, because Japan is not a party to any nuclear liability convention. However, the amount of compensation under this law was insufficient to cover all the damage caused by the two accidents. Therefore the Japanese Government paid additional compensation to supplement the liability of the operator. The amount of compensation required for the victims of the two accidents was much larger than that provided for under any nuclear liability convention. This emphasizes the urgent need for a comprehensive nuclear liability regime which fully covers the damage caused to victims of a nuclear accident.

Chapter 3 defined the legal concept and scope of reparable environmental damage caused by a nuclear accident. Such a definition is necessary to establish and determine the scope of liability for environmental nuclear damage. The chapter combined the examination of reparable environmental damage caused by a nuclear accident as a result of lawful and unlawful activities, despite their different bases of liability. It examined the physical environmental damage caused by a nuclear accident and the moral or legal damage resulting from the violation by a State of its environmental and nuclear obligations. The first is a constituent element in risk liability. Environmental damage caused by a nuclear accident is therefore an essential element on which the absolute liability of the operator of a nuclear installation or the Installation State is based. The reparable environmental damage caused by a nuclear accident should cover all the damage caused as a result of the impaired environment. The definition of reparable damage, under the nuclear liability conventions and other sources of international law, includes damage and loss caused to persons, property, the costs of preventive and reinstatement measures of the impaired environment, and economic loss caused as a result of a nuclear accident. Nevertheless, pure environmental damage is still difficult to define and is not clearly covered under the nuclear liability conventions. It is also problematic in international law because it is difficult to quantify and there are no generally accepted criteria or methods to calculate such damage. Finally, economic loss resulting from a nuclear accident is problematic, particularly pure economic loss, which is difficult to quantify. A nuclear accident can cause economic loss to many countries, even if they suffer no physical damage, as a result of embargos on the production of the countries affected by the accident, particularly the production of the Accident State which can affect the economies of many countries worldwide.

However, the element of damage is not a constituent element in State responsibility for wrongful acts. In order to invoke State responsibility for wrongful acts, it is not necessary that the conduct of a State causes physical damage to another State. However, it is difficult to invoke State responsibility without damage being caused by the State, as there is no liability without damage. Therefore, the doctrine of international law still refuses to accept the element of damage as a constituent element in State responsibility for wrongful acts or to accept liability without damage. Some authors consider that State responsibility is incurred only when physical damage is caused by a State's conduct. Others consider that it could be incurred without physical damage. Finally, still others argue for State responsibility to be invoked without physical damage, but they consider the violation of an international obligation to be legal damage, because in relation to nuclear activities it is the reason why a nuclear accident is caused by a nuclear installation.

Finally, certain conditions are required for there to be liability for nuclear damage caused by a nuclear accident. First, the reparable environmental damage should be caused by a nuclear accident or a nuclear activity as defined in the nuclear liability conventions. Secondly, the damage should be actual environmental damage. It is difficult for a State or the victims to claim reparation without actual damage, unless there has been a violation of an international obligation. Thirdly, there has to be proof of the causal link between the damage and the accident or the activity. If the damage does not result from a nuclear accident, it is difficult for the victims to claim for reparation of the damage under the nuclear liability regime. However, the problem of causation is not resolved either under the nuclear liability conventions or under the general rules of international law. There is no method or criterion for the determination of pure environmental and economic loss caused by a nuclear accident, particularly as regards the latent damage caused to persons, which may sometimes take a few decades to develop. Consequently it is difficult to prove the damage which constitutes liability. Fourthly, the damage must be significant, as insignificant damage is not covered under the nuclear liability conventions and the general rules of international law, but is covered under national law. However, there is no method to determine what is significant and non-significant damage caused to the environment. Finally, the damage must not have been previously compensated and must not be compensated twice, as damage repaired under national law cannot be claimed again under international law, unless the victim was not fully compensated under national law.

10.2.3 Functions of international liability

10.2.3.1 The preventive function

The use of nuclear energy for peaceful ends is a fundamental right in international law which allows any State to carry out a nuclear activity within its territory or under its jurisdiction or control. However, this right is not absolute. It is restricted by the fact that the State is obliged not to abuse that right by using nuclear energy for non-peaceful purposes and to respect the sovereignty of other States and not cause environmental damage to them. Chapter 4 addressed the principle of the prevention and reduction of environmental damage caused by a nuclear activity. It addressed two main issues, the legal basis of the principle and the cooperation between States to prevent and reduce environmental damage caused by a nuclear activity. It indicated that the principle of prevention is a fundamental principle in international law that obliges a State conducting nuclear activities within its territory or under its jurisdiction or control not to cause damage to the environment of other States. The principle is also interrelated with other principles, particularly the principle of due diligence and the precautionary principle. The Installation State is obliged to ensure that the nuclear activity is based on the principle of due diligence and to take precautionary measures to prevent and reduce harmful consequences of a nuclear accident. Thus these principles constitute an important tool to achieve the objective of prevention of damage caused by hazardous activities. Without exercising due diligence and taking precautionary measures, it is difficult to achieve the objective of the obligation of prevention for these activities. The principle of prevention was developed by the ILC in its draft articles on international liability for lawful activities, although it had a basis in international law even before the principle of due diligence and the precautionary principle existed. The obligation of prevention is aimed at the respect for nuclear and environmental obligations in order to prevent nuclear accidents. The violation of that obligation constitutes State responsibility for wrongful acts. The principle of prevention applies to lawful and unlawful liability because it is aimed at preventing damage caused by lawful activity and a violation of the obligation constitutes a wrongful act. Thus the principle forms the basis of State responsibility for a wrongful act. However, the principle of prevention is not absolute because it applies only in the case of significant damage caused to the environment, and therefore non-significant damage can be inflicted on the environment without incurring responsibility.

The examination also indicated that the principle of prevention does not only impose an obligation on the source State to prevent the damage, but also imposes obligations on it to cooperate with other States and with the

international organizations concerned to prevent damage to the environment. The effectiveness of the principle of prevention relies on the cooperation between the source State and the affected States in sharing the information related to the presumed nuclear activity. Thus cooperation between States constitutes an essential principle in international law in relation to conducting nuclear activities. It is aimed at preventing hazardous consequences of such activities. Without close cooperation between the source State and the affected States, it is difficult to effectively prevent nuclear damage which could be caused by nuclear activities.

To prevent environmental damage being caused by a nuclear activity, certain procedural rules and obligations of international law must be fulfilled by the source State and the affected States. They must be observed by the States during the construction of a nuclear installation, during the operation of a nuclear installation before and after a nuclear accident, and after the end of the economic life of a nuclear installation when it is decommissioning of the installation and the nuclear waste is disposed of. They constitute a comprehensive regime to prevent and reduce environmental damage which can be caused by a nuclear accident during the economic life of a nuclear installation. Before the construction of a nuclear installation, the State must establish a regulatory regime to organize the activity, select a site for the installation in a safe place that does not expose people and the environment to danger, assess the impact of the activity on people and the environment, and designate the person who is liable for the operation of the installation and for compensation of the victims in the event of a nuclear accident caused by it. The State must also inform the States most likely to be affected when a nuclear activity is conducted, particularly the neighboring States because they are the countries most affected by a nuclear accident caused by nuclear activities conducted within the State's territory. Moreover, the State also is obliged to ensure the safety of the nuclear installation and inspect it on a regular basis to ensure that safety standards are applied by the operating body in accordance of international standards. The international organizations concerned established international nuclear safety standards for different aspects of nuclear energy, particularly those established by the IAEA, to guide the States and harmonize their nuclear safety legislation. Unfortunately, States are not obliged to adopt these safety standards, except those contained in international conventions such as the 1994 Convention on Nuclear Safety and the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. In addition, the State is obliged to cooperate with other States, particularly the affected States and the international organizations concerned as regards the proposed activity and to provide them with the relevant information about

the activity. It must give prior notification, consult, negotiate, exchange information, and cooperate with them and the public in good faith in providing the relevant information. Finally, it must notify other States and the international organizations concerned in the event of a nuclear accident, provide assistance and cooperate with them to prevent and reduce the harmful consequences of the accident. These procedural obligations are carried out by the State under national law in accordance with the rules of international law.

These procedural obligations were examined in chapter 5. The examination showed that the application of these obligations is important to ensure the safe operation of a nuclear installation. They are necessary when a hazardous activity is carried out, particularly an activity related to nuclear energy, and it is necessary to apply the obligation of prevention and determine the content of the principle of prevention. Procedural obligations are mainly obligations contained in conventions. Some were developed after the Chernobyl accident. The delay of the USSR in giving notification of the Chernobyl accident led to a spread of the nuclear damage caused by the accident to a considerable number of States. Therefore the 1986 Conventions on early notification and assistance were developed after the accident. They contained two significant obligations, viz. the obligation of the State to give early notification of a nuclear accident and the obligation of the State to provide assistance. The two obligations are important to prevent and reduce environmental damage caused by a nuclear accident.

The State does not violate the obligation of prevention under international law if it has fulfilled these procedural obligations, even if damage is caused to the environment by a nuclear accident. The remedy for such damage falls under the principle of absolute liability. However, the violation of these principles constitutes State responsibility for wrongful acts. This creates a link between responsibility for wrongful acts and lawful hazardous activities. The procedural obligations are primary rules and their violation constitutes State responsibility for wrongful acts, which are secondary rules of liability. There is a legal basis for State responsibility for the violation of these obligations in international law. They were included in the ILC Draft Articles on the prevention of harm caused by hazardous activities and the principles on the allocation of loss, other ad hoc instruments and the general rules and customary principles of international law. Accordingly the State is responsible if nuclear activities are conducted in a nuclear installation in violation of the existing rules of international law. The State is responsible for a wrongful act if it has conducted a nuclear activity without enacting legislation or regulations to organize the activities, without conducting an environmental impact assessment or without the prior authorization or determination of the person who is liable, or if it has not observed nuclear safety standards. Finally, the

State is also responsible if it refused to cooperate with the States likely to be affected by a nuclear accident or provide these States or the public with the necessary information, or if it enacted or omitted to enact nuclear legislation in conflict with the existing nuclear agreements. Thus State responsibility is a relevant basis for the international liability of the State. It also has an important role in preventing nuclear environmental damage after a nuclear accident. This shifts the aim of liability from a preventive function to a reparative function.

10.2.3.2 The reparative function

The reparative function of liability is the main aim of any legal liability regime, whether civil or international and regardless of whether the liability is related to lawful or unlawful acts. It strikes a balance between two rights, the right of the injured person which has been reduced as a result of an act or activity of another person and that person's right which has increased in value as a result of the act. In order to repair damage caused by a violation of environmental and nuclear obligations, and environmental damage caused by a nuclear accident, the person who is liable, the applicable liability regime to remedy the damage, and the sources and legal consequences of that liability must be determined.

10.2.3.2.1 The person who is liable and the applicable regime of liability

Chapter 6 of this study identified the person who is liable and the applicable regime of liability. It examined whether or not there is an obligation upon the State to intervene to repair environmental damage caused by nuclear activities or whether the liability applies only to the operator of a nuclear installation, or both. It also examined whether a civil or international liability regime of nuclear liability applies to environmental damage caused by a nuclear accident. Moreover, it made a distinction between civil and international liability for environmental nuclear damage, investigated the possibility of integrating the two regimes in one unified regime, and determined whether or not such liability should be based on civil or international law, or both. This is particularly important because in practice and in theory there is some confusion about the relationship between the two regimes in relation to liability for environmental nuclear damage.

The examination revealed that when nuclear activities first started, States refused to accept any kind of liability for nuclear damage and therefore the operator of a nuclear installation was considered liable. However, at a later stage, States, as public entities, accepted sharing some of the liability with the operator of a nuclear installation, by providing additional compensation to victims of a nuclear accident under civil law. This was reflected in the

nuclear liability conventions which oblige the States to provide additional compensation to supplement the operator's liability. This was also adopted in the ILC Draft principles on the allocation of loss, which introduced civil liability in the international liability regime, but did not adopt the principle of State liability. The State only accepted international liability for environmental damage caused by a nuclear accident in a limited number of cases, such as environmental damage caused by space objects in accordance with the 1972 Space Liability Convention and in the case of a violation of its international obligations. Moreover, the IAEA Member States made some attempts to conclude inter-state treaties on nuclear damage or to introduce elements of international liability in the nuclear liability conventions, or to conclude an international instrument to deal with civil and international liability rules, but all these attempts failed. These developments were reflected in the doctrine of international law and of the ILC, which argues for a comprehensive international nuclear liability regime capable of repairing environmental damage caused by a nuclear accident. This should contain the provisions on nuclear liability under civil and international liability integrated in one unified regime of nuclear liability. However, the composition and integration of the nuclear liability regime of civil and international liability raises the question of how these rules can be applied, despite their differences. Therefore, as we will see below, it was suggested that these rules should be drawn up in one international instrument and that an international ad hoc court or tribunal should be set up to deal with civil and international claims for nuclear damage.

In my opinion, if such an integrated regime of liability is established, the civil liability procedures must be exhausted before international liability is applied. Accordingly, if the amount of the operator's liability is insufficient to compensate all the nuclear damage caused by a nuclear accident, the remaining damage should be compensated with supplementary funding provided by the States under the nuclear liability conventions. Compensation for nuclear damage can then only be claimed from the Installation State, if the damage is not compensated by the operator. Such compensation should be paid by the public authority of the State under the national legal system. If the victims cannot be compensated under the regime of civil liability, international liability should apply. The residual damage which cannot be compensated by public funds should be compensated by the State under international law. The State also is subject to international liability in the case of the violation of an international obligation under the nuclear liability conventions or under the general rules of international law. This means that the international nuclear liability regime should apply three stages or levels of liability according to the priority of the person who is liable to provide compensation

for the nuclear damage. These are the primary liability of the operator of a nuclear installation, the secondary liability of the State to intervene by providing additional compensation to supplement the operator's liability, and finally, the residual liability of the Source State, i.e., the original liability for the damage caused by activities conducted within its territory or under its jurisdiction or control.

This is justified by the fact that civil liability procedures favour of victims of a nuclear accident, as it is easier for the victims to claim reparation of the damage before national courts than before international courts. The victims must first make a claim against the operator of a nuclear installation. Imposing the residual liability on the Installation State is also justified because it allowed a nuclear activity, i.e., a hazardous activity which causes damage to other States, to be carried out in its territory or under its jurisdiction or control. It also benefits from this activity by improving its social and economic conditions, as reflected in the development of the State. At the same time, it can pay full compensation more easily than the operator. The adoption of the principle of State intervention in the nuclear liability regime is the first stage of the recognition by the State that it will share the burden of liability with the operator of a nuclear installation or will bear full liability for nuclear damage caused by nuclear activities. Furthermore, increasing the amounts of compensation with supplementary funding paid by the State in the last amendments of the nuclear liability conventions, makes it more likely that the State will accept full liability for nuclear damage under international law.

10.2.3.2.2 The origin and source of liability

The study indicated that the origin and source of international liability for environmental damage caused by nuclear activities is based on State responsibility for wrongful acts and the principle of absolute liability in accordance with international law. Chapter 7 examined State responsibility for wrongful acts as a source of international liability for its breaches or omissions in performing its environmental and nuclear obligations under the nuclear liability conventions and the general rules of international law, in the light of the ILC Draft Articles on State responsibility for wrongful acts. These Articles apply to the responsibility of the State in the case of the violation of the obligations of prevention, and minimizing and redressing environmental damage caused by a nuclear accident. The Articles defined and characterised the principle of State responsibility as a source of State responsibility for wrongful acts under the general rules of international law.

The principle is traditionally based on wrongful acts. The wrongfulness of an act is decided on in international law irrespective of the description of the act under national law. State responsibility for wrongful acts applies

when conduct which is considered unlawful under international law is attributed to a State. The acts which are attributed to the State are mainly those carried out by the organs of the State which have governmental competence, including those of the legislative, judicial and executive authorities, regardless of rank. However, such conduct must be described as being unlawful under international law. The act is unlawful when a State is not in compliance with the rules of international law and with regard to the obligation, i.e., the commission or omission of an obligation in conflict with international law. Environmental acts are described as being unlawful when an organ has committed a breach of an environmental or nuclear obligation under international law. This violation may be directly or indirectly related to any rule in international law, regardless of its source. It is a direct breach when it is committed by the State vis-à-vis its international obligations related to organizing a nuclear activity. However, it is an indirect breach in the case that a national law constitutes a breach of an international obligation of the State, such as a violation of national safety legislation under the Convention on nuclear safety. Accordingly, the violation of the State of its environmental and nuclear obligations and the attribution of a wrongful act to the State constitute State responsibility for wrongful acts. However, not all acts are considered wrongful acts. Under international law the wrongfulness is precluded in certain circumstances, including self-defence, force majeure, a fortuitous event, distress and a state of necessity. Furthermore, not all of these circumstances preclude wrongfulness with regard to the violation of environmental and nuclear obligations. For example, self-defence does not preclude environmental and nuclear obligations, as it is not acceptable for the State to use nuclear weapons for self-defence which can themselves cause an environmental catastrophe. In addition certain conditions limit the application of these circumstances to environmental and nuclear obligations. These circumstances do not apply to the peremptory norms of international law, which are concerned with the protection of the environment of the whole community. Because of the importance of the protection of the environment, particularly from pollution caused by new technologies, the 1996 Draft Articles on State Responsibility considered the violation by a State of its environmental obligations regarding the whole international community as an international crime. Unfortunately this provision was excluded by the 2001 Draft Articles on State Responsibility, which considered only a gross or systematic failure by the State to fulfil its obligations as a serious breach of international law. Finally, these circumstances cannot preclude a wrongful act when the circumstance in question has come to an end and the situation has normalised. Furthermore, the State is obliged to provide compensation for damage caused as a result of precluding the wrongful act.

The analysis showed that State responsibility for wrongful acts is an important source of international liability for the protection of the environment from hazards arising out of the use of nuclear reactors. The principle of State responsibility for wrongful acts applies in some nuclear and environmental cases. For example, the principle was applied by the ICJ in the Gabčíkovo-Nagymaros Project (Hungary/Slovakia) case in 1997 and by the International Tribunal for the Law of the Sea in the MOX Plant case (Ireland v. United Kingdom) in 2001. The importance of the application of the general principles of State responsibility for environmental damage caused by nuclear accidents is that there is no environmental or nuclear regime for State responsibility for wrongful acts. There is no inter-state treaty on international liability for nuclear damage which applies in the case of the violation of international obligations. The issues of environmental damage and pollution are mainly developed in international agreements. These agreements involve certain provisions and obligations which are necessary for the protection of the environment and prohibit harm to the environment, but they do not cover the issues of State responsibility for the violation of international obligations. They only include primary obligations which incur State responsibility for wrongful acts, while the rules of responsibility are secondary rules which determine the conditions and consequences of State responsibility under the general rules of international law. This indicates that State responsibility for wrongful acts is an important basis for the prevention of nuclear accidents and avoiding environmental damage. This emphasises the progressive development of the rules of international liability in international law as well as the function of international liability. It not only has a corrective function as in the classical idea of international liability, but also has a preventive function. It also indicates the applicability of the general rules of State responsibility for wrongful acts to environmental cases.

Despite the importance of State responsibility for wrongful acts to protect the environment from damage caused by nuclear activities, liability for nuclear damage is essentially based on the principle of absolute or risk liability. Under this principle, liability applies when actual damage is caused by a nuclear installation as a hazardous activity, regardless of any fault, negligence or wrongful act committed by the operator of the installation or the State. Thus the damage is a constituent element in risk liability. Liability is incurred by the State if environmental damage is caused by a nuclear accident, even if this damage was associated with a violation of an international obligation. However, a number of exceptions are made under the nuclear liability conventions, e.g., for armed conflicts, hostilities, civil war and insurrection, which limit the liability under the principle, and make it strict rather than absolute.

Chapter 8 examined the main aspects of absolute liability for environmental damage caused by nuclear activities as lawful activities not prohibited by international law. This included the concept of the principle and the justification for its application to environmental damage caused by nuclear activities, and the basis and origin of the absolute liability of a State for environmental nuclear damage caused by such activities under the general rules of international law. It also included the absolute liability of the operator under the nuclear liability conventions and other instruments related to the liability for nuclear activities, because most nuclear activities are carried out by private enterprises. The polluter pays principle was examined because the liability under this principle is similar to the absolute liability under the nuclear liability conventions. Finally, the chapter looked at the relationship between the rules of liability under civil and international law, because the liability under the nuclear liability conventions covers the absolute liability of the operator under civil law, and a breach of these conventions constitutes State responsibility under international law.

The examination of the sources of State liability under international law revealed that the principle of absolute liability is an essential principle in international law applicable to liability for environmental damage caused by nuclear energy. State liability for nuclear damage is established when nuclear damage is caused by a nuclear activity carried out by the State within its territory or under its jurisdiction or control and there is a basis of liability under the general rules of international law. However, it also revealed that there is more evidence for the application of the principle to the liability of the operator of a nuclear installation than to the liability of the State.

Unlike the principle of State liability for wrongful acts which was adopted by the ILC in its Articles on State responsibility for wrongful acts, the ILC failed to adopt the principle of the absolute liability of the State as a general principle of international law in its draft articles on international liability for acts not prohibited by international law, and based the liability on civil liability of the operator of the activity.

Furthermore, there is little evidence in treaty law to support the absolute liability of the State. The only convention which clearly supports the principle of the absolute liability of the State is the 1972 Convention on the liability for damage caused by space objects which was applied to the liability for damage caused by Cosmos 954 in 1978.

There is also support for the principle of absolute liability in the general principles of law based on the doctrine of the *Rylands v Fletcher case*. A number of national laws in the civilized nations, including the nuclear liability legislations, adopted the principle to govern liability for damage caused by ultra-hazardous activities. They support the application of the principle to

liability for environmental damage caused by nuclear activities. However, there are some writers reject these principles unless they are accepted as general principles of international law.

Moreover, the general and customary principles of international law support the absolute liability for environmental damage, but they are still in conflict with the doctrine of international law which is divided about accepting the principle of absolute liability of the State either as a general principle of international law or as a customary international law principle.

Finally, there are some environmental and nuclear cases in international case law that support this liability. However, there little support in state practice and judicial cases to support the absolute liability of the State. There are a limited number of nuclear and environmental cases which cannot be considered evidence for the existence of a general or customary international law principle of absolute liability that applies to liability for environmental damage caused by nuclear activities. In state practice the principle was applied, for example, in the Cosmos 954 case, which was based on the 1972 space convention and the general principles of international law. In the Marshall Islands Nuclear Tests which were conducted by the United States in the Marshall Islands in 1954, the US did not recognize its legal liability for damage caused by these nuclear tests and paid an *ex gratia* payment to the Japanese Government. However, judicial cases that support liability for environmental damage caused by nuclear activities were based on State responsibility for wrongful acts rather than on absolute liability. For example, in the 2001 MOX Plant Case (Ireland v. United Kingdom), the Tribunal ordered the two parties to cooperate to exchange information regarding the activity and to take appropriate measures to monitor the risks and effects, and to prevent environmental damage to the maritime environment. The violation of this obligation incurs State responsibility for wrongful acts. Furthermore, in the 1941 Trail Smelter Arbitration Case the Tribunal did not indicate whether or not its decision was based on absolute liability or wrongful act responsibility. Therefore, the doctrine of international law still differs on whether to consider that the Tribunal decision concerning the payment of compensation by Canada for environmental damage and pollution caused by the Smelter to the US is based on the principle of strict liability or wrongful act responsibility.

In contrast, the principle of absolute liability for environmental damage caused by nuclear accidents is clearly supported by the nuclear liability conventions and other civil liability instruments that apply to environmental damage caused by nuclear activities. The operator's liability for environmental damage is recognized in the nuclear liability conventions, the 2006 Draft principles on the allocation of loss and other related international in-

struments. These instruments channel the liability to the operator of the activity under civil law. The conventions provided for the absolute liability of the operator of a nuclear installation because he is the prime beneficiary of the operation of the installation and the States rejected the liability for damage caused by such activities under international law.

10.2.3.2.3 The legal consequences of responsibility and liability

The establishment of State responsibility and liability for environmental damage caused by a nuclear accident also establishes a new obligation in international law for the responsible State to bear the legal consequences of liability for a violation of its obligations and for transboundary environmental damage caused by a nuclear accident. The legal consequences of international liability for environmental damage caused by a nuclear accident were discussed in chapter 9 of this study. As no environmental or nuclear liability regime provides for the legal consequences of State responsibility and liability, the general rules of international law apply. Under these rules, the legal consequences of State responsibility for wrongful acts are the cessation of the illegal act and reparation of the damage, i.e., restitution, compensation and satisfaction. However, as the liability for damage caused by lawful activities is based on the idea of absolute liability, the legal consequence of liability is compensation for the damage. It is the only legal consequence of international liability for damage caused by hazardous activities in general, and under the nuclear liability conventions for environmental nuclear damage caused by nuclear activities in particular. Therefore according to these rules, the legal consequences of liability for environmental nuclear damage might be the cessation of the nuclear activity in question in the event of a violation of nuclear safety requirements or providing an official apology to the injured State if the damage is slight, or providing compensation for environmental damage, or reinstating the impaired environment to the *status quo ante*. These forms of reparation are applied depending on their relevance. For example, the cessation of a nuclear activity is relevant in the case of the violation of nuclear safety requirements in order to avoid the occurrence of a nuclear accident and damage caused by a nuclear installation. However, restitution in kind as a form of reparation for environmental damage is not relevant in the case of damage caused by a nuclear accident because it is difficult to return an object when it has been damaged, though it is possible to value the damage in terms of monetary compensation or to pay the costs of preventive and reinstatement measures to prevent and eliminate environmental damage.

This reveals that the legal consequences of State responsibility for wrongful acts related to nuclear activities are different from those related to the

reparation of environmental damage caused by a nuclear activity which is based on absolute or risk liability. The former is aimed at the respect of environmental and nuclear obligations. This also helps to prevent and minimize harmful consequences, while the latter is aimed at the reparation of actual environmental damage caused by a nuclear accident. This also reveals that the legal consequences of international liability have been developed along with the development of the rules of international liability as adopted by the ILC draft articles and the amended nuclear liability conventions. They are not only aimed at the reparation of damage, as in case of the classical role of international liability, but they also have a preventive role aimed at preventing environmental damage. Similarly, after the amendments of the nuclear liability conventions, liability for environmental damage based on risk is aimed at preventing damage because the State is obliged to pay the costs of preventive measures as a legal consequence of its liability.

The adoption of the duty of cessation and guarantees of the non-repetition of illegal acts by the ILC Draft Articles on State Responsibility for wrongful acts is a significant development in the law of State responsibility for wrongful acts. It shifts the aim of State responsibility from only repairing damage caused by an illegal act to the cessation of such an act and guaranteeing its non-repetition in the future. This is significant for the protection of the environment. Shutting down a nuclear reactor which has violated its environmental obligations is an effective way of preventing environmental damage which could potentially be caused by a nuclear accident. A reactor which operates in conflict with international safety requirements must stop operating in order to avoid a major nuclear accident. Thus cessation is an instrument to avoid damage and State responsibility. Unfortunately, in practice the courts have not applied the principle of cessation in nuclear cases very often. In the MOX Plant Case in 2001, Ireland requested the Tribunal to order the UK to immediately suspend the authorization of the MOX plant to protect the maritime environment from radioactivity caused by the plant, but the Tribunal ordered the two parties to cooperate and consult in exchanging information regarding the activity and to take appropriate measures to prevent the risks and the damage.

In addition, reparation is the second legal consequence of State responsibility and liability for environmental damage caused by a nuclear activity after the cessation of a wrongful act by a State. Unlike cessation, which is only a legal consequence of State responsibility for a wrongful act, reparation is a legal consequence of liability for lawful and unlawful activities. The responsible State must make full reparation for material environmental damage caused by a nuclear accident and moral damage caused as a result of the violation of environmental and nuclear norms under international law. The

purpose of reparation is to balance the interests of the responsible State and the injured State in the case of environmental damage both before and after the accident, or in cases when norms of international law have been violated. The original situation which existed before the damage to the environment or before the rules governing the environment were violated must be restored. Therefore restitution is the first form of reparation under international law. However, in most cases it is difficult to return the *status quo ante*. The Chernobyl accident showed that it is impossible to restore the impaired environment to what it was before the nuclear accident, but it was possible clean up the environment so that it could be used again. Some places contaminated by radioactivity are still unusable as a consequence of the accident. Therefore, compensation is the most effective form of reparation under international law in these cases and is a common legal consequence of international liability for lawful and unlawful acts. It is the second form of reparation if restitution is not possible.

Compensation for environmental nuclear damage is based on the nuclear liability conventions and the general rules of international law. Under the nuclear liability conventions, compensation is provided by the operator of a nuclear installation, who is obliged to maintain financial security to cover his liability. The conventions or the national law of the Accident State provide the applicable law. The competent court to claim for compensation is also the competent court of the Accident State. The judgments of the competent courts are recognized and enforced by the Contracting States. Furthermore, the conventions oblige the State to guarantee the liability of the operator and to provide additional funds for victims of a nuclear accident when they cannot be compensated under the operator's regime or he failed to provide compensation. Nevertheless, it was clear that this additional compensation is insufficient to repair all environmental damage caused by a major nuclear accident, because liability and compensation are limited by the amount of compensation provided for under the applicable convention for a nuclear accident. On the other hand, only a small number of nuclear States participate in the nuclear liability regime under the nuclear liability conventions. Consequently, compensation for nuclear damage caused by a nuclear accident in a nuclear reactor must to be paid by the governments of the victims in the case of transboundary damage. As the study indicated that compensation for nuclear damage caused by the Chernobyl accident was paid by the governments of the victims because the USSR was not a party to any nuclear liability convention, the amount of compensation under other nuclear liability conventions was limited to cover all the damage caused by the accident. For example, the economic loss suffered by Belarus was estimated at US$235 billion and Germany only paid 291 million DEM compensation in

individual cases. Compensation for nuclear damage caused by the Tokaimura and Fukushima accidents was also paid by the operators of the installations under Japanese law because Japan is not a party to any nuclear liability convention. It was supplemented by the Japanese Government because the operators could not fulfil their financial obligations. In the case of the Fukushima nuclear accident, the Japanese Government agreed to give financial assistance to the operator amounting to JPY 5 trillion ($62 billion) to compensate the victims of the accident. The initial assessment of the damage caused by the accident was estimated at approximately $235 billion. Therefore, the residual liability must be borne by the State, though there is a little evidence in international law to support the liability. Under international law, compensation for environmental damage is assessed by the court, unless the parties in dispute have agreed the amount of compensation. However, there are no generally agreed criteria for States to assess the damage and determine the amount of compensation. Therefore international courts and tribunals rely on the criteria established by national law as a guideline to determine the amount of compensation, because compensation must be determined according to the rules of international law, not national law.

10.2.4 The relationship between State responsibility, State liability and civil liability

The study indicated that liability for environmental damage caused by nuclear accidents is governed by State responsibility for wrongful acts, State liability for lawful activities based on the principle of absolute liability, and civil liability under the nuclear liability conventions, which cover the absolute liability of the operator of a nuclear installation. These regimes of liability are applied together to environmental damage caused by a nuclear accident. Although each of these regimes of liability is independent and should apply on its own, there are certain relationships between them that facilitate their integration in one comprehensive unified regime of nuclear liability that also applies to liability for environmental damage caused by a nuclear accident.

In general, there is a clear relationship between State responsibility for wrongful acts and State liability for lawful acts. Before the ILC made a distinction, the two topics were both related to international liability which applied to damage caused by lawful and unlawful activities. However, the difference between the two regimes lies in the basis of liability, as unlawful activity is based on wrongful act responsibility, while lawful activity is based on risk or absolute liability. The two topics were divided as a result of all sorts of development and the increased use of the hazardous industrial activi-

ties which jeopardised the international community and put it at risk of catastrophes that can cause serious damage. Therefore, the three draft articles and principles related to international liability adopted by the ILC, i.e., the 2001 Draft Articles on State Responsibility for Wrongful Acts, the 2001 Draft Articles on Prevention of Harm Caused by Hazardous Activities and the 2006 Draft Principles on the Allocation of Loss, which codified the general rules of international liability, apply to environmental damage caused by a nuclear accident.

As mentioned above, State responsibility for wrongful acts is necessary to control the operation of a nuclear activity in accordance with the rules of international law and to prevent and reduce environmental damage. This is important for the protection of the environment. It guarantees the respect of environmental and nuclear obligations regarding the operation of a nuclear activity to avoid nuclear accidents, because the violation of these obligations can lead to a nuclear accident. Furthermore, environmental damage caused by hazardous activities does not necessarily result from a breach of an international obligation, but could be the result of a nuclear accident caused by lawful activity. In that case, the liability is constituted on the basis of risk liability. State liability is necessary to remedy environmental damage caused by a nuclear accident. Thus the regime of international liability for environmental damage caused by nuclear activities is one topic, but it has different bases, depending on the case in question.

At the same time, despite the fact that a distinction can be made between the regime of nuclear liability under the nuclear liability conventions which governs the civil liability of the operator of a nuclear installation, and the regime of nuclear liability under international liability which governs the liability of the State for nuclear damage caused by nuclear accidents, there are a number of factors which prove the relationships between the two regimes and facilitate the creation of a comprehensive nuclear liability regime based on the rules of civil and international liability. For example:

(1) The nuclear liability conventions are sources of international law according to Article 38 (1) (c) of the ICJ Statute and sources of international liability. They provide for State liability for nuclear damage if there is a basis for liability under the general rules of international law. Furthermore, the nuclear liability conventions do not preclude the rights of the State under international law in relation to nuclear damage or breaches of obligations provided for by the Conventions which incur State responsibility for wrongful acts.

(2) The nuclear liability conventions contain a number of principles related to nuclear liability. Some of these principles, such as the principle of

absolute liability, are principles of international law, despite the fact that the divergence of the doctrine of international law about being considered principles of civilized nations or customary international law principles. In fact, the ILC Draft principles on the allocation of loss, which must incur State liability, focused on civil liability and cover the same issues of liability as those concluded in the nuclear liability conventions.

(3) Compensation for nuclear damage is a common legal consequence of liability under the nuclear liability conventions and State liability for nuclear damage caused by nuclear activities.

(4) Under the nuclear liability conventions the State is obliged to guarantee the liability of the operator and to provide additional compensation to compensate environmental nuclear damage. This liability is governed by the rules of civil law, not international law. However, a breach of these obligations incurs State responsibility for wrongful acts under international law.

(5) Despite the fact that the State, as a subject of international law, is responsible only for acts of its organs and representatives, and is not responsible for acts of individuals as private subjects, according to the opinions of international lawyers and decisions of international courts, it is responsible for the conduct of individuals if it did not control the conduct of those persons and failed to observe the duty of diligence or due care. Most nuclear activities are operated by private operators, and at the same time they are carried out within the territory or under the jurisdiction or control of the State. The State also has a supervisory role over these activities.

(6) The nuclear liability conventions refer to the settlement of disputes between the contracting parties, arising from the interpretation or application of the conventions or the determination of maritime zones which are resolved under the general rules of international law.

10.3 Recommendations

The study makes certain proposals to improve and fill the gaps in the international nuclear liability regime. These include the establishment of interstate conventions which cover civil and international liability issues (10.3.1), the ratification of the recent nuclear liability conventions by the nuclear States and the implementation of the new rules adopted by the ILC draft articles and the nuclear liability conventions (10.3.2), the creation of an ad hoc tribunal for nuclear damage (10.3.3), the creation of standards for the assessment of environmental damage and compensation (10.3.4), and conducting in-depth research into certain liability issues which are not adequately examined in this study (10.3.5).

10.3.1 A single instrument for civil and international liability (comprehensive regime)

The study indicated that neither the nuclear liability conventions which apply to civil liability, nor the rules of State liability under the general rules of international law is – on its own – adequate to deal with liability for environmental damage caused by a nuclear accident. The nuclear liability regime has become complicated as a result of the numerous nuclear liability conventions which apply to the question of liability for nuclear damage. Furthermore, it is difficult to deal with all the nuclear damage caused by a major nuclear accident under the existing liability regime in the absence of a binding inter-state treaty which governs State liability for nuclear damage. The study therefore suggests the creation of an international instrument which contains the rules on nuclear liability, both civil and international liability. This instrument should include all the elements and principles of civil and international liability relating to nuclear damage. It should be based on the following main elements:

(1) the liability of the operator of a nuclear installation;
(2) State intervention to supplement the liability of the operator;
(3) the obligation of the State and the operator to take preventive measures and to ensure nuclear safety standards;
(4) the obligation of the State to provide early notification and prompt assistance in the case of a nuclear accident;
(5) the obligation of the State to repair nuclear damage caused to other States and the global commons by a nuclear accident;
(6) the principle of absolute liability;
(7) the principle of wrongful act liability, and;
(8) the legal consequences of the liability of the operator and the State for environmental damage caused by a nuclear accident and for a violation of international obligations.

More specifically, the structure of a new convention on nuclear liability should be based on the existing principles and provisions of nuclear liability under the nuclear liability conventions and those provided for under other international instruments governing liability for injuries caused by ultra-hazardous activities. The proposed convention should contain the same legal principles and nuclear liability issues provided for under the Paris and the Vienna Conventions, i.e., the principle of absolute liability, a definition of a nuclear accident, a definition of nuclear damage, the limitation of liability in terms of time and amount, insurance, the channelling of liability, the juris-

diction of the court, exoneration, etc. It should also deal with all the issues related to liability for damage caused by nuclear ships, the transport of nuclear materials, the decommissioning of a nuclear installation, non-peaceful nuclear activities and the disposal of nuclear waste. The adoption of the principles of nuclear liability under the nuclear liability conventions in one instrument will integrate and harmonize the national nuclear liability laws under a unified international liability regime. On the other hand, the new convention should also contain the main principles and elements of international liability, including the liability of the Installation State to take the preventive measures, providing information and assistance in time, and the reparation of nuclear damage caused by a nuclear accident. It should include the basic elements of State responsibility for wrongful acts, the absolute liability of the State and the legal consequences of State responsibility and liability for nuclear damage. This would create a comprehensive international nuclear liability regime which could cover all the nuclear damage caused by a nuclear accident inside and outside the territory of the State.

10.3.2 The ratification of the recent instruments and the implementation of their provisions in national law

The recent amendments to the nuclear liability conventions are a significant step forward in the development of the nuclear liability regime. Nevertheless, they created a vacuum between the conventions and the national legislation of the Contracting Parties to cover nuclear damage caused by nuclear accidents. The substantial liability provisions adopted in the 1997 Amended Vienna Convention, the 1997 Supplementary Compensation Convention, the 2004 Amended Paris Convention and the 2004 Amended Brussels Supplementary Compensation Convention resulted in a lack of harmony between the nuclear liability conventions and national nuclear liability legislation. This affects the implementation of the liability provisions when a nuclear accident occurs. The new provisions in the amended conventions cannot be effective unless they are adopted and implemented by national legislation. Therefore the existing national legislation of the Contracting Parties to the nuclear liability conventions must be amended to include the new provisions adopted by the conventions.

One of the main obstacles to the implementation of the new instruments is the lack of ratification and acceptance by the Contracting Parties. Therefore the study recommends expanding the ratification of the nuclear liability conventions and other related international instruments. This increases the number of contracting parties to the nuclear liability conventions and expands the geographical scope of application of these conventions. This

means that more compensation will be available to victims of a nuclear accident. This particularly concerns the ratification of the conventions by nuclear States. The number of contracting parties to the nuclear liability conventions is limited and most of the States that have ratified the conventions do not have nuclear installations. As mentioned above, the US which operates a quarter of the nuclear installations worldwide is not a party to the nuclear liability conventions, except for 1997 the Vienna Convention on Supplementary Compensation for Nuclear Damage. The Chernobyl accident demonstrated that the participation of non-Contracting States in the conventions will benefit the victims in their state in the case of a nuclear accident. Therefore the international organizations which sponsor the nuclear liability conventions should convene an international conference and invite their Member States to ratify the recent instruments modifying the conventions and to implement the provisions in their national legal systems. This could encourage them to ratify the conventions and encourage other States to participate in the regime.

The current situation as regards the ratification of the nuclear liability conventions following the amendments is disappointing. Only nine States ratified and acceded to the 1997 Protocol amending the Vienna Convention. Three of these States have minor nuclear installations and three others have no nuclear installations. The 1997 Convention on Supplementary Compensation for Nuclear Damage was ratified by four States including the US, but it has still not entered into force. The 2004 Protocols amending the Paris Convention and the Brussels Supplementary Compensation Convention, were each ratified by two States, but have not yet entered into force. Finally, there are major nuclear States such Canada, China, India, Japan and South Korea, which are not parties to any nuclear liability convention.

Similarly, the ILC Draft Articles on prevention of harm, the ILC Draft principles on the allocation of loss and State responsibility for wrongful acts contain significant substantive and procedural rules which should be implemented by States if they also conclude nuclear and environmental agreements and in national law. The ratification of the 2001 Draft Articles on State Responsibility is particularly important in the case of a violation of environmental and nuclear obligations. Furthermore, the ratification of the 2001 ILC Draft Articles on prevention of harm is important to prevent and reduce the harmful consequences of a nuclear accident. Similarly, the 2006 ILC Draft Articles on allocation of loss is important to guide States in the implementation of civil liability for damage caused to the environment.

10.3.3 An international court for nuclear disputes (procedural rules)

The study also suggests the establishment of an ad hoc international court or tribunal to deal with all the disputes arising with regard to nuclear damage caused by nuclear activities. This should be competent to deal with claims from all the victims, individuals and States. Such an ad hoc court is important to avoid jurisdictional conflict when more than one nuclear liability convention is applied to nuclear damage caused by a nuclear accident or in the case of the establishment of an international liability regime composed of civil and international nuclear liability rules. The establishment of such a court is also important to ensure equity for the victims of a nuclear accident in the case that the amount of compensation under the applicable convention is insufficient to compensate all the nuclear damage that was caused. In particular, the amount of the operator's liability is limited for each nuclear accident under the nuclear liability conventions. The competence of that forum should include civil and international disputes relating to nuclear damage. It should be competent to deal with claims for compensation for nuclear damage caused by a nuclear accident in the territory of a contracting party and for transboundary nuclear damage, also in the territory of non-contracting parties. Finally, it should be competent to decide on disputes arising from the interpretation or application of the nuclear liability conventions.

Indeed, international disputes relating to transboundary environmental nuclear damage can be resolved by the ICJ or the Permanent Court of Arbitration (PCA). There are some environmental and nuclear cases, as mentioned throughout the study, that have been dealt with by the ICJ and PCA such as the Nuclear Test cases, the Gabčíkovo-Nagymaros Project case and the MOX Plant case. However, the significance of such ad hoc forums is justified by the fact that, these Courts deal with the international disputes between States. However, an ad hoc forum can deal with civil and international disputes in a much broader sense. As the study suggested transboundary environmental damage caused by nuclear activities should be governed by a comprehensive regime of liability which covers civil and international liability. Accordingly, an ad hoc court should only deal with nuclear disputes on a case by a case basis.

10.3.4 The creation of standards for the assessment of environmental damage

The study revealed that the assessment of environmental damage, particularly pure environmental damage, is still a major problem in international law. Furthermore, pure economic damage caused as a result of the impaired

environment is not covered by the nuclear liability conventions because it is difficult to calculate. It is therefore suggested that States should agree on a specific standard or method for the assessment of environmental damage caused by nuclear accidents which should be generally accepted. There are some examples of methods to calculate environmental damage in national law, and these could be used as a guideline by international courts and tribunals. However, these methods differ from one national law to another. If such a method were adopted, it should take into account not only the commercial value of the environment, but also the value of nature and the long-term impact of the environmental damage on public health and on the cleaning-up costs of the impaired environment. The valuation should have a legal and economic basis and should be drawn up in a legal document containing evidence for the valuation of the damage and compensation. At the moment, new technologies can provide an economic assessment of the impaired environment. The method used to estimate environmental damage should the same for all States.

10.3.5 The follow-up and further research

A number of issues have not been dealt with adequately in this study. Further research is needed. The most important of these are the issues of civil nuclear liability, State liability for environmental damage caused to the global commons, liability for damage caused by private activities, and State liability for damage caused by nuclear activities used for non-peaceful ends. These four issues were not adequately examined in this study due to the limited space available as planned in the study.

The study mainly examined the issues of international liability and responsibility for environmental nuclear damage under the general rules of international law, the liability of the operator and State intervention to provide additional compensation under the nuclear liability conventions. However, some of the liability issues under the nuclear liability conventions require further examination and should be dealt with in a separate study. This particularly applies to liability for environmental damage caused during the disposal of nuclear waste, the decommissioning of a nuclear installation, the transport of nuclear materials and the safety of nuclear installations. These four issues are certainly still very complicated issues in the nuclear liability regime and require particular attention.

Similarly, the issues of State liability for environmental nuclear damage caused to the global commons need to be examined because if these areas, particularly maritime areas, are left to be used irresponsibly by States, the global commons will be damaged and this damage will also affect the States.

The issue of State liability for environmental damage caused to the global commons was actually studied by the ILC during the codification of international liability, but no concrete conclusion was reached. This is because the issues of damage to the global commons and the attribution of liability to the State are very complicated.

In addition, an in-depth study of State liability for environmental damage caused by private nuclear activities is important because most nuclear activities are carried out by private enterprises. The State has an important role in permitting, controlling and supervising the nuclear activities. However, the liability of the State for environmental damage caused by private activities has not yet been defined. Therefore this matter requires further research.

Finally, the study did not contain an examination of international liability for environmental damage caused by nuclear activities used for non-peaceful ends. This question was also excluded by the ILC in its draft articles related to international liability and the nuclear liability conventions. It was discussed during the amendments to these conventions, but was rejected by the nuclear States. Furthermore, it is not dealt with in the doctrine of international law. Nevertheless, it requires particular attention because damage caused by the use of nuclear activities for non-peaceful purposes can cause and environmental catastrophe, and in some cases it is difficult to distinguish between nuclear activities used for peaceful purposes and those used for non-peaceful purposes. For example, nuclear activities for peaceful uses can produce nuclear materials used for the production of nuclear weapons. Enriched uranium used for the production of nuclear weapons is produced from spent fuel from nuclear reactors used for peaceful purposes. Furthermore, nuclear waste resulting from both peaceful and non-peaceful uses can be disposed of in the same site without any distinction being made between them.

10.4 Final conclusion

The study concludes that the State is responsible for environmental damage caused to other States by nuclear activities carried out within its territory or under its jurisdiction or control, according to the general rules of international law. The State is obliged to prevent environmental damage which is caused by nuclear accidents to other States and is responsible for the violation of its obligations in accordance with wrongful act responsibility, and for environmental damage caused by a nuclear accident in accordance with the principle of absolute liability, and it is responsible for the legal consequences of such liability. State responsibility for wrongful acts constitutes a general principle of international law adopted by the ILC in its Draft Articles on

State Responsibility for Wrongful Acts. However, there is no general principle or customary principle of international law on the absolute liability of the State for environmental damage caused by nuclear activities or by hazardous activities in general which is acceptable to the doctrine of international law or which has been adopted by the ILC. Accordingly, it was considered that the State and the operator of a nuclear installation should share liability for nuclear damage caused by a nuclear accident if the damage exceeds the operator's capacity to pay or the limit imposed by the applicable nuclear liability convention. The operator has primary liability for environmental damage caused by a nuclear accident and the State has secondary liability and must provide additional compensation to the victims in accordance with the nuclear liability conventions. Finally, the State has primarily liability for the residual damage and for the violation of its obligations under international law. Therefore the study suggests the establishment of an international nuclear liability regime for nuclear damage integrating the elements of civil and international liability in one convention, as well as the establishment of an ad hoc court to deal with civil and international claims for nuclear damage, including environmental damage.

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